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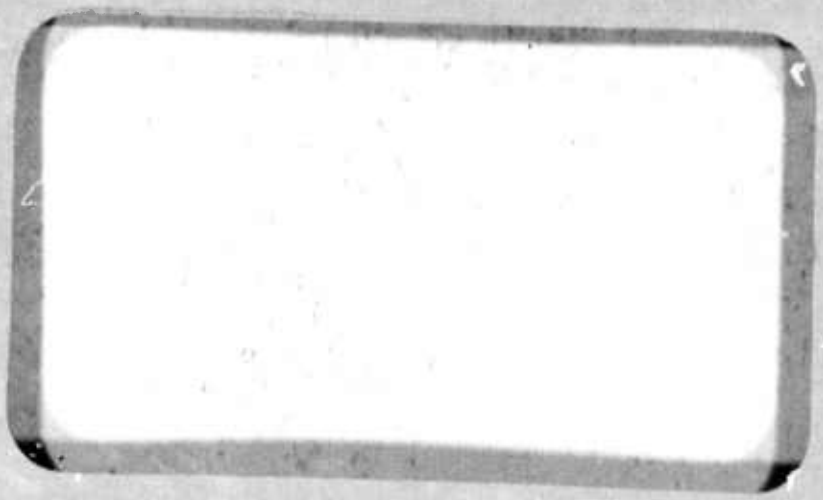

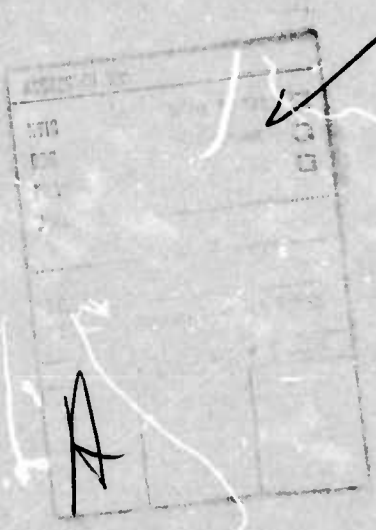

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This report describes the development of long-range forecasting models for the Middle East, Latin America, and Africa. Volume I, the Executive Summary, summarizes the work on all tasks in non-technical language. Volume II, Research Findings, describes the long-range forecasts and simulations and their implications for strategic policy and planning. Volume III, the Technical Appendix, describes in detail all phases of the study. These include the identification of key concepts and their operational referents, the specification

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of forecasting equations, and the construction of the three region-specific forecasting models.

Guidelines for generating forecasts and simulations are also presented in the Technical Appendix to enable Department of Defense personnel to become better acquainted with the approaches to generating meaningful, interesting, alternative futures for comparing the strategic implications of contrasting developments. Finally, the Appendix contains several annexes that identify the nations used in the study, the years and sources of all data, the model parameters, the computer forecasting program and data, the results of a standard forecast, and a sample simulation.

C.A.C.I.

WASHINGTON, D.C. OFFICES

FINAL TECHNICAL REPORT

STOCHASTIC SIMULATIONS OF LONG-RANGE FORECASTING MODELS

VOLUME II

Research Findings

October 31, 1975

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PREFACE

This report describes the development of long-range forecasting models for the Middle East, Latin America, and Africa. The research was supported by the Defense Advanced Research Projects Agency, Contract No. MDA903-75-C-0179.

For the past three years CACI has been engaged in an effort to enhance forecasting capabilities within the Department of Defense. In particular, that effort has sought to apply social science research methodologies to the problem of projecting important economic, political, military, and social variables over a 5- to 20-year range. The forecasts produced so far have been directed toward the Joint Long-Range Strategic Study (JLRSS), prepared by JCS/J-5. During the first phase of this effort, CACI developed a few very simple models to forecast key concepts (international conflict, international alignment, and domestic stability) for 20 Indian Ocean countries and demonstrated the potential utility of combining substantive expertise with quantitative methods. This combination was the basis for later efforts. As a result of this study, a second phase was planned and completed. A more complex model (12 interrelated equations rather than the 3 independent equations developed the previous year) was constructed for Europe to forecast five central environmental descriptors (international conflict, international alignment, international trade, internal instability, and national power base) over the long range.

The primary goal of the current project is to enhance long-range forecasting capability in the defense community by developing and introducing new methodologies that add a simulation capability. A second, but no less important, purpose is to provide the defense community with high quality forecasting models for the Middle East, Latin America, and Africa in support of the JLRSS. In this connection, JCS/J-5 has operational current models for the Middle East, Latin America, and Africa that can be

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used to generate alternative futures and to manipulate policy-sensitive variables. Changes in these variables can be considered representative of policy shifts by the United States and the Soviet Union.

The current innovations are designed to handle the highly volatile situations found in the developing world and to produce usable forecasts on the basis of the imperfect data available for these regions. The models include stochastic (probabilistic) elements to project events like irregular governmental transfers (coups) which are probabilistic by nature. The most important new element in the regional models is the simulation capability which will permit hypothetical policy choices by the United States and the Soviet Union to be evaluated in an experimental setting by giving the analyst the capability to examine the impact of alternative U.S. and Soviet behavior toward the Third World regions. Hence, the project provides JCS/J-5 with a specific forecasting capability tailored to the development of long-range estimates of strategic plans and requirements.

This final report is presented in three volumes. Volume 1, the Executive Summary, summarizes the work on all tasks in non-technical language. Volume II, Research Findings, describes the long-range forecasts and simulations and their implications for strategic policy and planning. Volume III, the Technical Appendix, describes in detail all phases of the study. These include the identification of key concepts and their operational referents, the specification of forecasting equations, and the construction of the three region-specific forecasting models.

Guidelines for generating forecasts and simulations are also presented in the Technical Appendix to enable Department of Defense personnel to become better acquainted with the approaches to generating meaningful, interesting, alternative futures for comparing the strategic implications of contrasting developments. Finally, the Appendix contains several annexes that identify the nations used in the study, the years and sources of all data, the model parameters, the computer forecasting program and data, the results of a standard forecast, and a simple simulation.

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Dr. Herman Weil, project director
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CHAPTER 1. INTRODUCTION

This introductory chapter identifies the objectives and accomplishments of the research effort and the structure of this volume.

OBJECTIVES

The primary goal of the current effort is to develop methodologies that can be used in preparing medium- and long-range defense policy and plans. The methodologies consist of econometric (principally forecasting models), simulation, and statistical analysis techniques. Each approach is applied to develop high-quality forecasting models useful in preparing future defense policies and plans to be included in the Joint Long-Range Strategic Study (JLRSS).

The following tasks were necessary for meeting the objectives of the project.

- In consultation with JCS/J-5 personnel, select three additional world regions for the development of long-range environmental forecasting.
- Identify a set of key concepts for inclusion in the forecasting model for each region and develop operational measures for them, while maintaining comparability within regions and with the previously developed European model, where possible.
- Establish linkages among key variables measuring each concept and identify, where appropriate, exogenous predictors of the key variables that can be manipulated by the JCS/J-5 analyst.
- Estimate parameters for each forecasting model using techniques appropriate to the particular structure of each regional model.

- Develop stochastic simulations of the forecasting models and generate forecasts of the key concepts mentioned for the Middle East, Latin America, and Africa.

Each of these tasks has been successfully completed and the stochastic simulation models have been implemented on the JCS/J-5 computer facility in the National Military Command System Support Center (NMCSSC).

ACCOMPLISHMENTS

The stochastic models for the Middle East, Latin America, and Africa that have been developed for JCS/J-5 are:

- Dynamic. The equations and the forecast variables specifically show change from one year to the next. Thus, the output from the forecasting models permits an assessment of the direction and degree of change on a variable as well as comparative analysis of nation profiles across all variables. In this way, the more volatile nations can be identified and evaluated.

- Sensitive to U.S. and Soviet behavior. The models are capable of representing the impact of U.S. and Soviet behaviors and policies on the future African, Latin American, and Middle Eastern environments. They permit J-5 analysts to alter specific policy-sensitive variables to project alternative futures.

- Region-specific. The substantive peculiarities of each region are taken into account in specifying the forecasting equations, and the parameters that drive the forecasting models are determined for each region.

These innovations will provide JCS/J-5 with a specific forecasting capability tailored to the development of long-range estimates of strategic plans and requirements. In addition, they permit hypothetical policy choices by the United States and the Soviet Union to be evaluated in an experimental setting by giving the analyst the capability to alter the U.S. and Soviet roles in the less developed regions. In this way, the

impact of U.S. and Soviet behavior on the Third World regions can be better understood. Toward this end, a number of specific accomplishments that contribute to the overall goal of the study should be mentioned.

- Three less developed regions (the Middle East, Latin America, and Africa) were identified and defined in consultation with JCS/J-5 personnel. The members of each region were specified (see Technical Appendix, Annex I).

- The set of forecast variables was expanded and modified to take into account substantive regional peculiarities of the lesser developed regions vis-a-vis the five central environmental descriptors.

- Several national power variables were added to capture more realistically the complexities of economic, political, and military power.

- A new approach to measuring alignment was developed in which trade and U.N. voting were combined to capture the incongruities between international economic and political orientations that characterize the Third World nations.

- Turmoil was redefined to better represent popular discontent and unrest in Third World countries and a coup propensity indicator was developed to measure the extent to which a country is prone to irregular government change.

- A tension ratio variable was included to represent the propensity for a less developed country to engage in military conflict. This ratio is derived by comparing a nation's actual defense spending to its expected spending (given the size of its Gross Domestic Product).

- A set of 18 theoretical forecasting equations were developed in consultation with JCS/J-5 personnel. These were tested and parameters estimated for each region. The result was three region-specific forecasting models that take into account the substantive differences of each region modeled.

- A set of exogenous predictor variables, including arms transfers, trade, foreign aid, and military aid, were included in the variable set. This improvement permits the analyst to simulate change in outside influences so that various assumptions about the impact of alternative policies can be examined.

STRUCTURE OF THE REPORT

The remainder of this report is divided into three chapters and a summary. Chapter 2 discusses the regional forecasts for the Middle East, Latin America, and Africa. Chapter 3 describes the methods employed in developing the regional models. Chapter 4 discusses the introduction of the simulation capability for manipulating policy-sensitive variables and the results of sample simulations for each of the regions under study.

In the detailed review of the regional forecasts (Chapter 2), six specific areas are covered -- background, economic factors, military factors, international alignment, conflict, and strategic implications.

1. Background. In this section the general characteristics of each region are covered. These include the key areas that have implications for policy and planning for each region: general political characteristics, history of economic development, orientations of the nations with regard to the superpowers, and any specific peculiarities that exist in the region. Furthermore, the first forecast variable, population, is treated in this section and those nations whose growth patterns are of particular interest are singled out for special emphasis.

2. Economic Factors. Here the forecasts for each region that pertain to the economic growth or stagnation of the nations of the Middle East, Latin America, and Africa are reviewed. Many of the specific variables that are forecast, such as Gross Domestic Product (GDP), are less significant as absolute measures than as ratio variables, such as GDP per capita. The discussions, therefore, emphasize the per capita variables. In addition, the international aspects of each country's economy are also evaluated for the forecast period, including exports, imports, and balance of trade.

3. Military Factors. In this section, the projected military power base of the key actors in each region is evaluated. Here the interest

is in the growth in defense expenditures, military manpower, and the per capita distributions of each of these variables. On the basis of these projections, the military capability of each nation can be assessed from a strategic point of view.

4. International Alignment. The tendency of the nations to orient themselves politically and economically with either of the superpowers is captured by several projected variables. These are international trade with the United States or the Soviet Union, the degree of which each nation votes with either country in the United Nations, the imbalance between trade and voting (alignment instability), and the extent of total economic and political involvement in international relations (alignment intensity). These latter two measures are of particular interest and importance. Alignment instability reveals the inconsistency in a nation's alignment and is evaluated by comparing the direction of economic alignment (toward either the United States or Soviet Union) with the direction of political alignment as indicated by voting in the United Nations with either the United States or Russia. The second aggregate measure, alignment intensity, reveals the extent to which the less developed nations become involved in international political and economic activity. In other words, alignment intensity is a measure of the magnitude of international involvement whereas alignment instability is a measure of consistency in the direction of alignment.

5. Conflict. In this section the conflict probabilities for each region are described for those countries that demonstrate either an excessive level of projected conflict or a propensity for conflict indicated by a tension ratio that compares actual defense spending with expected defense spending, given a nation's GDP. When actual defense spending exceeds the expected level for a country, its propensity for conflict is said to be high. In addition, domestic stability is investigated and the levels of turmoil and the probability of coups are evaluated. When a nation has a high level of turmoil and a past history of coups that exceed a specified threshold in the forecasting model, it becomes a candidate for

government change. Nations that reveal a continuing propensity for government change are identified.

6. Strategic Implications. Here the significant nations in each of the forecast regions are identified. Strategic implications are based on overall assessment of the forecasts for each country in each region. Those nations in which the United States currently has an interest, either politically or economically, are scrutinized. In addition, groups of countries, sets of rival countries, and general regional interactions are evaluated to assess their strategic implications. This section concludes with a discussion of the strategically significant nations in each region.

Each section contains a table that emphasizes the degree and direction of change forecast for key variables for important nations. These tables also permit individual countries or groups of countries to be evaluated from a strategic perspective.

Chapter 3 provides a general, non-technical overview of the less developed regional forecasting models. Its purpose is to acquaint the reader with the changes necessitated by modeling the less developed regions, the rationale behind the structure of the model, and the importance of the many improvements in the applications of stochastic simulations for long-range forecasting in support of the defense community.

Chapter 4 discusses the inclusion of the simulation capability in the forecasting models. The three sample simulations that were designed to project policy changes and their implications are discussed. The simulations carried out are representative of the capability that now exists within JCS/J-5 long-range forecasting. The simulations cover three different plausible situations. Future simulations are possible and can be generated from the current set of computer programs.

The volume concludes with a summary chapter that recapitulates the contents of this volume and some of the strategic implications that derive from the findings about the Middle East, Latin America, and Africa.

CHAPTER 2. FORECAST SUMMARY FOR THE MIDDLE EAST, LATIN AMERICA, AND AFRICA

This chapter describes the projected Middle Eastern, Latin American, and African environments. The discussions deal with each region separately and are divided into six sections: background, economic factors, military factors, international alignment, conflict, and strategic implications. The concluding section on strategic implications assesses the forecasts for strategic policy and planning in support of U.S. interests and security in the region.

The six sections describing the forecasts for the three less developed regions generally conform to the format of Volume I of the Joint Long-Range Strategic Study (JLRSS). The categories describe the central environmental descriptors jointly developed for previous forecasting studies by CACI and JCS/J-5 personnel. The five descriptors are national power base, international trade, international alignment, international conflict, and internal instability. Economic factors refer to those measures that contribute to the economic power base of a nation. Military factors are measures such as defense spending, size of military, and military aid that contribute to the military power base. International alignment refers to a nation's political and economic orientations toward either the United States or the Soviet Union. And conflict involves both domestic instability and international conflict. This approach permits the format of the JLRSS and the actual research design to be molded so that the discussions can be utilized for policy-planning documents.

THE MIDDLE EAST

Background

The most serious continuing threat to international peace is in the Middle East, where the United States has affirmed its commitment to the survival of Israel and the Soviet Union has expressed its opposition to U.S. policies and support for Arab causes. The United States has, of necessity, demonstrated its concern for the attitudes and interests of the Arab countries in the area. The need for Middle Eastern oil to supplement domestic resources, Soviet attempts to penetrate the region, the region's history of border disputes, requests from some nations for military hardware and economic assistance, and the rapidly changing political scene in the region, encourage this concern.

Economically, the Middle East can be divided into two basic groups. Some of the countries are, or have the potential to become, extremely wealthy; others remain poverty-stricken. The dependence of the wealthy on oil exports to finance development and expand military capabilities links them economically to Europe and the United States. Rising oil prices have substantially increased export revenue in the region and enable the oil-rich nations to spend large sums in industrial and economic development and overseas investment. Recognition of this growing interdependence has encouraged policy shifts in Europe and the United States that promote independence from the Middle East. However, these policies inevitably place limitations on oil consumption and have brought about the reduction of training exercises, reduced production of propellants, and caused some reorientation of research and development (Brown, 1975: 181-199).

Currently, the majority of political regimes in the Middle East are either predominantly military-civilian or purely military. In addition, they are fundamentally authoritarian, ranging from absolute monarchies

(Iran and Saudi Arabia) to populist-civilian democracies (Israel, and to a certain extent, Lebanon) to Marxist-Leninist regimes (South Yemen). The political evolution of most of the Middle Eastern nations has not been without conflict. Traditional rivalries within and between nations, border disputes, and ethnic confrontations have plagued the region for the past 20 years.

At the same time, the United States and the Soviet Union have competed overtly and covertly for influence in the Middle East. The Soviet Union has made inroads into Egypt, Syria, and Iraq and has influenced other states in the region (Yemen) politically and enhanced its economic transactions with them. The United States has made efforts to increase cooperation with Iran and Saudi Arabia in a number of important areas, and more recently courted Egypt. It also continues efforts to enhance the security and development of the individual nations in the area with military assistance programs and foreign aid. Arms arrangements with certain Arab nations as well as with Israel exemplify this two-dimensional approach.

The nations of the Middle East have, as a result of the new-found wealth of the major regional nations, expressed a desire for greater military strength. To this end, they have sought to purchase arms from the Western industrialized nations and from the Soviet Union. The United States has maintained an interest in these developments primarily because of its concern for regional security to ensure continued access to the region's oil and markets. Thus, military supplies that can support regional security are of particular concern. Continuing U.S. support for Israel that may involve military support for that state's survival is also important. Finally, the expanding militaries of the region, together with the continued possibility of overt international conflict, suggest that the level of violence and the number of crises in the area may escalate, conceivably to the point where nuclear weapons are employed. Although superpower interest in the region generally revolves around the Arab-Israeli confrontation, other traditional conflicts have spotted

the history of the region--Iraq and Iran, Syria and Lebanon, Morocco and Algeria, and Egypt and Libya. Other rivalries that tend to divide the region derive from differences in value systems (conservative versus liberal), different religions within nations, and competing political factions. Finally, the inequitable distribution of wealth that typifies most of the nations in the region exacerbates the existing tensions within and between nations.

Population.[1] The population projections for each less developed region are determined by applying a constant rate of change to current levels of population for each subsequent year. This approach is a standard forecasting technique for estimating the size of a nation's population over time. Because no less developed country has shown a population decline, it is assumed that similar patterns will prevail in the future. Also, because the average rates of change for each region are slightly in excess of 3 percent, we can expect the total populations of the largest nations to approximately double in the 20-year period of the model.

In the Middle East, the average rate of population growth is 3.5 percent. This figure is distorted by Kuwait's rate of population growth which is 9.8 percent. When Kuwait is eliminated from the calculations of this average, the population growth rate reduces to 3.05 percent. Six nations in the region begin the forecasting period with populations larger than 10 million in 1976: Algeria, Egypt, Iran, Iraq, Morocco, and Sudan. (See Annex VI of the Technical Appendix.) Of this group, Algeria, Iran, and Iraq have population growth rates of 3 percent or more. By the end of the forecasting period (1995), only 5 of the 15 Middle Eastern countries remain below 10 million in total population, but no nation exceeds 62 million, the projected population for Egypt.

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[1] The forecasts deal with total population. This ignores both the existence of age and ethnic groups that can contribute to the military power base or can undermine national cohesion.

It is important to contrast the population growth in the Arab nations with the growth in Israel. If population can be interpreted as a resource that can contribute to military capability in less developed nations, then power, in terms of population, favors the Arab nations. However, because it is the smaller nations that are contiguous to Israel--Egypt, of course, being the only exception--population becomes less important in the balance of power equations.[2] Nevertheless, throughout the forecasting period, the ratio of Egypt's population to Israel's remains consistently over 10 to 1. Hence, the expected population pattern emphasizes the importance of neutralizing Egypt through diplomacy or other means.

Economic Factors

Domestic Economics. In interpreting forecasts for the economic sector of the Middle Eastern nations, it is more revealing to compare predictions for several nations than to look at each nation's individual values. It is also important to understand the interrelationships among the variables that forecast each national attribute. The manner in which the parameters for the economic sectors for each region were estimated ensures that they are the most accurate of all the parameters in each model.[3] However, in a region as diverse as the Middle East, forecasts based on current growth, which is abnormal, will have a tendency to overestimate certain values. Thus, the results must be interpreted in comparative terms. (See Chapter 1 of the Technical Appendix.)

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[2] When resource power (population) and military power are investigated empirically, the limited impact of population on military capability in the Middle East becomes apparent. This is because the Middle Eastern nations rely less on quantity (in terms of personnel) and more on quality (in terms of military hardware).

[3] The ecoromic parameters are estimated on a country-by-country basis. Hence, they are country-specific rather than region-specific.

In judging the forecasts for the Middle Eastern region, one must always consider the impact of oil on the economies of the region.[4] Currently, virtually all of the wealth in the region is related to oil. Thus, total GDP is forecast to grow considerably for the oil producers. However, when one looks at gross domestic product per capita, the picture changes greatly. At the beginning of the forecasting period, Kuwait, Israel, and Libya lead the Middle Eastern nations in per capita gross domestic product. However, on the basis of the projected growth as a result of the influx of petro-dollars, Iran and Saudi Arabia are shown to experience the greatest material per capita growth. This growth must, however, be viewed in light of continued inflation and the possibility of reduced revenue as Western demands for petroleum products decline or oil production is cut.

Those countries with few resources that currently depend on the major oil exporters for financial support fail to show much progress. Their performance is in part a function of the effects of inflation, worsening balances of trade, and the failure to invest capital for growth. The nations that appear to suffer the most during the forecasting period, in that they fail to demonstrate any real potential for growth, are Algeria, Israel,[5] Jordan, Kuwait, Morocco, and Yemen. The failure to experience material growth can be a source of domestic unrest and political upheaval. The findings and forecasts on the domestic economic sector reveal that the conditions within these countries may reach proportions that result in domestic violence.

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[4] For example, even the non-oil-producing Middle Eastern countries (except Israel) benefit from oil export revenue. Saudi Arabian financial support for Syria, Lebanon, Egypt, and Jordan is an excellent case in point.

[5] The diversion of domestic spending into defense must be cited as the cause of Israel's projected stagnation. The chances that Israel will permit such a long-term decline in its economic power are no doubt remote. The model suggests that tremendous levels of economic or military aid will be necessary to sustain the viability of the Israeli economy against the projected huge defense costs of the next two decades.

International Economics. Only a few of the nations of the Middle East -- Iran, Iraq, Kuwait, Libya, Saudi Arabia, and Syria -- begin the forecasting period (1976) with a positive balance of trade. The only country failing to show a positive balance of trade by the end of forecasting period is Israel, whose exports and imports become evenly balanced.[6] We alluded earlier to the potential for stagnation in the Israeli economy. It appears that partial explanation for this development is Israel's negative balance of trade. For the most part, the two major oil exporters in the region, Iran and Saudi Arabia, reveal accelerating export revenues. One other country that appears to demonstrate considerable growth potential is Syria. However, Syria's past conflicts result in large positive changes in military manpower and defense spending that would no doubt overly burden the country's economy. Thus, the economic projections for Syria must be viewed as reflecting the impact of these pressures.

Military Factors

The past history of conflict in the Middle East has produced conditions that have resulted in per capita defense spending and military manpower levels that are the highest in the less developed regions. Ultimately in 1995, the final year of forecasting, only two nations (Iran and Kuwait) spend less than 10 percent of their total GDP on defense. However, at the same time, the percentage of population in the military remains within acceptable levels that average around 5 percent. This suggests that the Middle Eastern nations will continue to emphasize the quality of their military establishments rather than the quantity of their manpower.

The diversion of oil revenues into the military establishment of the Arab nations is an ongoing process. Contemporary Iran, in particular, is a case in point. Nations in the region will continue to try to advance

[6] Israel's balance of trade moves consistently from -$662 million to 0 from 1976 to 1995.

their militaries to more sophisticated levels. Of course, should hostilities continue to plague the region, this level of sophistication would become a serious issue. In the event of another war, increased destruction and the involvement of nations outside the region become increasingly probable.

Finally, the capability for developing nuclear weapons in the region should not be overlooked. Israel currently has a technological base capable of producing such sophisticated weaponry. The availability of capital from oil revenues for research and development could enhance the Arab position.

Conflict in the Middle East is a function of the interaction among forces such as high percentages of defense spending relative to GDP and the intense interest of the United States and Soviet Union in the international politics of the region. The escalatory nature of arms races in the Middle East results from past conflict, the notion that deterrence can temporarily prevent conflict, and military assistance from the superpowers to maintain current strength. These three components reinforce one another to fuel conflict in the area. The nature of this interrelationship is discussed in Chapter 3, where a simulated arms reduction in the Middle East is described. In short, the capabilities of the Middle Eastern nations to engage in military conflict are projected to grow throughout the next 20 years primarily as a result of the expected potential for violence in the region.

International Alignment

The Middle Eastern region presents an interesting contrast to Africa and Latin America with regard to international alignment. Because they are financially richer and currently more politically involved in international relations, the nations in the Middle East tend to function rather independently. They are aligned simultaneously with more than one major nation or group of nations and seem to be increasing their economic orientations

toward the Soviet Union and away from the United States. They are also increasingly involved in international economics as evidenced by their increasing propensity to trade. Of course, this development is explained by the growth in their economies (that makes them more attractive partners), a development that can be attributed to the importance of oil to their overall growth.

With regard to political alignment, the Middle Eastern countries tend to vote with the Soviet Union in the United Nations. However, from the standpoint of the less developed nations, voting with the Soviet Union may be more coincidence than actual identification with the principles of the Soviet Union. The Soviet Union, often for purely political reasons, expresses its concern for issues that are salient to the Third World nations and votes accordingly.

The direction and intensity of alignment are important for the changes that take place over the forecasting period. First, countries in the Middle East continue to shift their political orientations toward the Soviet Union and away from the United States. However, the directional shifts evidenced in the forecast are not substantial. The propensity to align does shift some and the nations, in general, tend to become less involved in international political affairs.[7] Despite this development, the nations of the Middle Eastern region tend to be involved economically and politically and, therefore, their total alignment propensity is higher than that for either Latin America or Africa.

Only a few nations in the Middle East reveal consistently high alignment instability -- Iran, Libya, Saudi Arabia, Iraq,[8] and Syria. Of this group,

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[7] We interpret this development in the following way: As the richer nations in the region grow, they become less supportive of Third World issues. Hence, a tendency to become less involved with North-South issues is the result.

[8] Recently, reports of large oil reserves have added Iraq to the list of Arab countries with vast oil-exporting capabilities.

the first four are particularly significant because they are sources of oil consumed by the Western nations. Kuwait, initially inconsistent in its alignment orientations, eventually resolves the imbalance in Russia's favor. Instability occurs because the oil producers are economically oriented toward the Western industrialized nations but politically oriented toward the Soviet Union. The remaining nations in the region reveal stable alignment patterns and tend to be aligned with the Soviet Union. In most cases these are the poorer and less strategically significant nations. One interesting country is Morocco,[9] where the United States has a vested interest for maintaining communications facilities. Throughout the entire forecasting period, this country reveals rather stable alignment with the Soviet Union despite U S. involvement. This situation should be monitored closely since there is considerable potential for embarrassment of the United States and sudden loss of the communications capability.

Conflict

International Conflict. The overall conflict levels forecast for the Middle East are the highest for the three regions. The conflict scores are a weighted average of three types of hostile behavior (pressure, coercion, and physical violence). Those nations with histories of overt violence, such as Israel and Egypt, should be viewed as having the greatest conflict potential. Egypt's conflict score remains the highest of all nations in the region throughout the forecasting period, showing a minimal decline over time.

In general, the average level of conflict for all nations increases throughout the projected range. By 1995, the conflict levels of only four nations--Egypt, Iran, Saudi Arabia, and Syria--decline; but the reductions are minimal. Two nations, Kuwait and Tunisia, do not change at all. The five

[9] Morocco is one of the more vociferous supporters of Third World causes in the United Nations, which explains its propensity to appear aligned with the Soviet Union.

nations whose conflict levels increase the most from 1976 to 1995 are Israel, Jordan, Lebanon, Libya, and Yemen.

Based on these projections, traditional rivalries should be expected to flare up periodically but point predictions of such incidences are, of course, not the goal of forecasting techniques. Thus, the high level of conflict forecast makes it imperative that the region be monitored for international crises.

Domestic Conflict. The authoritarian nature of many of the regimes in the Middle East, the general tendency toward the involvement of the military in government, and the elitist nature of many of the societies and other cultural factors, contribute to moderate to low levels of popular political unrest in the region.[10] There is, however, a history of coups that have resulted in the establishment of military regimes. As in the other regions, domestic politics and economics are positively linked such that economic progress seems to lessen the tendency for domestic violence that results in political upheaval, and vice versa. Because this region has greater potential for material growth than the others, turmoil declines throughout the forecasting period.

The increase in economic strains suggests that four countries--Israel,[11] Jordan, Kuwait, and Yemen--will continually be candidates for government

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[10] The current civil strife in Lebanon, because it represents conflict between major political factions and borders on civil war, is not present in the forecasting model for the Middle East. The emphasis is placed on mass instability (the "masses" in Lebanon have been little involved in the current fighting) and on the probability of coups (elitist in-fighting). Political civil war not involving riots and other mass violence is rare in the Middle East, so the model was built to focus on other things.

[11] The appearance of Israel as a candidate for government change derives from the imbalances between non-defense and defense spending that are caused by Israel's need to keep pace with its rivals. However, Israel's strong democratic traditions and national cohesion suggest that, despite conditions ideal for a coup, government change in the country will continue to be orderly. That is, the conditions for a coup will be present but the likelihood of one is not considered high.

change through coups d'etat. Jordan remains a candidate for a coup through the late 1970's but experiences a decline in coup probability in the early 1980's and falls below the coup threshold throughout the remainder of the forecasting period. Yemen remains a candidate for government change through 1985, but eventually ceases to have a high coup potential as a result of some economic growth. Kuwait, on the other hand, remains a candidate for domestic violence with turmoil and a high coup probability throughout the entire forecasting period. Only one other country, Tunisia, surpasses the coup probability threshold. However, Tunisia is a candidate for only two years in the mid-1980's.

Strategic Implications of the Middle Eastern Long-Range Forecast

General. A number of factors impinge on U.S. relationships with the Middle East: the geographic location of the area, its virtual inaccessibility without intermediate stopping points, its volatility and history of past international conflict, and its possession of large volumes of oil. As time passes, there is little evidence that the tension in that region will abate. From a long-range planning perspective, this means that regional security and the possibility of U.S. involvement must receive continued attention. It also means that policy and planning must be formulated to maintain access through air and sea links to the region.

At the same time, greater emphasis must be placed on the formulation of policy that takes into account the unstable nature of alignment with regard to those nations whose economic and political orientations are not in balance (such as Iran and Saudi Arabia). Because of the importance of the international trading sector to the oil-exporting countries, U.S. economic power may be influential in attracting political as well as economic support for U.S. interests. U.S. economic leverage clearly can be applied to gain greater political support from these nations. However, some nations such as Iraq appear unshakable in their economic and political orientations.

With regard to conflict in the region, reinforcing relationships among arms races, defense spending, and past conflict are positive forces for continued hostilities in the region. These positive feedback linkages invariably lead to escalation in arms acquisition and defense spending. They may be disrupted if U.S. and Soviet cooperation in the region can succeed in reducing the emphasis on military build-ups. In addition, a reduction of aid to the more conflict-prone nations may cause a lessening of tension by decelerating ongoing arms races.

U.S. policy in the past has been to provide advice within a carefully planned approach to a potentially combustible set of relationships, to supply knowledge and technology in both civilian and military areas, and to demonstrate sincere interest in the region as a community. Having pursued this policy, the United States retains considerable influence in the area despite Soviet attempts to undermine it. Nevertheless, the alignment instability of many of the richer nations demands that constant diplomatic vigilance be maintained. Furthermore, the projected high levels of conflict dictate that military vigilance be maintained as well.

The military and industrial viability of the United States that has and will continue to form the basis of its deterrent strength still depends to a large extent on the uninterrupted flow of oil from the Middle East. In turn, economic progress and the elevation of the quality of life in that region depend to a large extent on the United States for regional security through military assistance and training, technical assistance, and a sound international financial system. This symbiosis is of considerable strategic importance and should strengthen in the future.

The evolution of interdependence is encouraged by the accelerated economic growth projected for the oil-rich nations. However, it must be emphasized that the 1976-1995 projections are based in part on the rates of change that these nations experienced during the early 1970's. It is unlikely that such rapid development can continue over the long run. As the

industrialized nations seek and find alternative sources of energy to lessen their dependence on Middle Eastern oil and natural gas, export revenues will inevitably decline and development will necessarily slow. To maintain reserves for longer periods, oil production has been held below capacity. Price rises have been employed to capitalize on the inexorable consumption of energy by the industrialized nations. Each of these developments has strategic implications. Energy for support of defense-related industries may become increasingly limited. Materials, and components on which sophisticated hardware depend, may be reduced as oil is limited. Training and exercises that waste needed fuel may have to be eliminated to maintain stockpiles.

Other developments have strategic implications as well. This study has not assigned probabilities to the contingency of U.S. military involvement in any form in the Middle East. However, the high levels of conflict forecast for the area lead to the conclusion that such a possibility must be entertained. Thus, general purpose forces must be prepared for such a contingency. Equipment (both combat and support) must be available, transport and logistics must be constantly monitored, alternative air and sea links must be secure and U.S.-ally relations must be maintained to ensure basing and overflight rights. Without proper diplomatic and military efforts, U.S. support of Middle Eastern security cannot be effective.

Finally, it is in the U.S. strategic interest to continue to provide military assistance in the form of training and modernization. This can include support for the incipient air defense forces of most of the Middle Eastern nations, the training and equipping of naval forces where needed, the construction of military facilities, and the reinforcement and/or upgrading of ground defense forces to deter traditional enemies, such as Iraq and South Yemen, whose activities clearly thwart the spirit of a Middle Eastern community.

Summary. This section on the strategic implications of the long-range forecasts for the Middle East concludes with a summary table (Table 1) that recapitulates the forecasts generated by the Middle Eastern model. The table presents an overview of the more important results for the strategically significant nations and sums up the degree and direction of change forecast by the regional model to facilitate an evaluation of the overall country profiles. It also permits a comparison of the countries on particularly important economic, military, or political attributes. Finally, it allows the JCS/J-5 analyst to assess the overall significance, change, and expectations of each regional forecast.

In inspecting the table, the first step should be to analyze each country and to understand its general profile as forecast over time. Accordingly, each row of the table should be inspected individually. Next, each country should be compared with the other countries on the specific environmental descriptors by inspecting the columns of each table. Once these two steps have been completed, the overall interrelationships among the rows and columns can be better evaluated.

In the table, the country name and its rival are presented. Then, reading from left to right, changes in economic factors, military factors, information on international alignment, conflict probabilities, and a general assessment of the strategic importance of each country to the United States are presented. Each of these major categories is broken down into the key attributes of the nations that were discussed in the preceding section of the regional forecasts. Thus, economic factors refers to both the domestic economic characteristics and the international trading patterns of the individual nations. Military factors describes change in defense expenditures and military manpower. International alignment presents four specific types of orientation: alignment with the United States (US), alignment with the Soviet Union (USSR), nonalignment (NA), and multi-alignment (MA). This latter category refers to an orientation that suggests that a nation interacts to a rather high

TABLE 1

STRATEGICALLY SIGNIFICANT MIDDLE EASTERN NATIONS

Country	Rival	Change in Economic Factors		Change in Military Factors		International Alignment			Conflict Probability			Strategic Importance
		Domestic	Internat'l	DEFX	MILM	Direction	Intensity	Instability	Internat'l	Domestic	Gov't Change	High = H Medium = M Low = L
Egypt	Israel	++	--	+	+	USSR	+	0	0	0	0	H
Iran	Iraq	++	++	0	0	MA	+	0	-	0	0	H
Iraq	Iran	+	+	+	0	USSR	+	-	+	0	0	M
Israel	Egypt	--	++	-	0	US	0	-	+	0	0	H
Lebanon	Israel	+	-	++	0	MA	0	-	+	0	+	M
Kuwait	Iraq	--	--	--	--	MA	+	--	0	+	0	M
Libya	Egypt	+	++	++	--	MA	+	0	+	-	+	M
Morocco	Algeria	0	--	++	-	MA	+	--	+	0	0	L
Saudi Arabia	Iraq	++	++	+	--	MA	+	0	0	0	0	H

KEY: ++ = High positive change
+ = Moderate positive change
0 = No change
- = Moderate negative change
-- = Severe negative change
US = Aligned with U.S.
USSR = Aligned with USSR
MA = Multi-aligned
NA = Non-aligned

degree with several nations. The next category refers to the intensity of alignment or the extent to which a nation becomes involved in the international system. The third facet of alignment is the change in the instability of a nation's alignment. All Third World nations under study experience alignment instability (inconsistency between economic and political patterns of allegiance) at one time or another. The alignment instability column identifies the extent to which instability increases (+), remains the same (0), or decreases (-) during the forecast period.

The next category, conflict probability, reveals the propensity for each nation identified either to engage in international conflict, or to experience domestic unrest and become a candidate for government change during the 20-year forecasting period. The final category, strategic importance, assesses the overall strategic significance of each of the nations included in the table. This assessment is a generalized evaluation based on the information presented in the table, the known importance of the nation to the United States or to the Soviet Union, and a comparison of that nation's forecast future with current conditions.

The symbols employed in these tables identify the extent and direction of change over the full 20-year forecast period. Thus, when rapid economic growth is forecast for a particular country, that nation will receive "double plus" evaluation (++). Nations experiencing severe declines in their domestic economies during the forecasting period would receive a "double minus" (--). These two categories represent the extremes of our coding scheme. All other evaluations fall between the double plus (++) and the double minus (--) range. It should be emphasized that these symbols are used to indicate change and that the starting values for countries are not indicated.

The summary table for the Middle East gives a generalized impression of the forecast for each nation for all categories. Two countries in particular, Iran and Saudi Arabia, emerge as potential economic powers in the

region. At the same time, Israel and Kuwait are forecast to suffer considerable economic declines over the 20-year forecasting period. The remaining countries fall somewhere between these extremes. Since Iran retains rather stable military capabilities, it represents the most economically potent and politically stable nation in the region. Other nations with potential for some military expansion are Libya, Egypt, Saudi Arabia, and Iraq.

However, any expansion will no doubt absorb much-needed development capital, producing tension between the economic and politico-military sectors. Nations with increasingly viable economies (for example, Iran and Saudi Arabia, two of the world's largest oil producers) will continue to become intensely aligned in the international system but will remain unstable in their alignment orientations. They will tend to orient their economic interests toward a number of countries (multi-alignment) and continue this pattern. Their political orientations, however, will remain toward Third World issues in the United Nations and will appear politically aligned with the Soviet Union.

Four nations in the region tend to be increasingly conflict prone over the 20-year forecasting period; Israel, Iraq, Libya, and Morocco. Based on Israel's economic forecast, propensity to conflict, and orientation to the United States, the future of its military appears less than secure. As projected, Israel will become less able to support a large military establishment and remains a candidate for military assistance from the United States. Unless such assistance is provided, the future economic and military viability of Israel is seriously threatened. In addition, although Kuwait reveals less of a propensity to conflict than Israel, its rival, Iraq, reveals an increasing probability. Iraq's economic and military future appears shaky, given potential conflicts with both Kuwait and Iran.

The United States has already provided limited military assistance to Kuwait. Such assistance must continue if Kuwait's future defense against

Iraq is to be bolstered. Again, as forecast, there seems to be little change projected in domestic violence and government change for the Middle East. Only Israel and Kuwait surpass the coup threshold. This development is explained purely in economic terms and reinforces the interrelationship among domestic economic conditions and the propensity for irregular government change in the Middle East.

It is very difficult to evaluate the comparative strategic importance of the Middle Eastern nations because, from a military and diplomatic viewpoint, they are all strategically important. In light of the current Middle Eastern situation and the importance of oil and natural gas to the United States and Western Europe, four nations--Egypt, Iran, Israel, and Saudi Arabia--should be considered the key countries in the region on which U.S. military and national security policy should be focused.

LATIN AMERICA

Background

The countries of Central and South America have always been important to the United States. Their geographic proximity to this country increases their importance for U.S. security. In recent years, the Latin American nations have increasingly asserted freedom of action from the United States, indicating a determination to function as independent actors in the international system. Although some nations have failed to experience rapid growth, several influential countries (Argentina, Brazil, Peru, Venezuela, and Mexico) are among the most rapidly developing countries in the world and have respectable industrial sectors. They have achieved sufficient economic and political significance to engage in international relations as independent forces, and have embarked on policies involving the transfer of arms, international trade, and military infrastructural development quite apart from their relations with the United States.

Nationalism continues to be a major factor in their political and economic decisions. Despite the low probability of violent conflict between them, the Latin American nations continue to spend money on national defense. Hence, the military establishments of the region are an increasingly significant factor in intra-Latin American and Latin American-U.S. relations. The recent emergence of military regimes in several key countries, with a variety of different ideological positions, is of considerable concern to the United States in promoting its own and hemispheric interests.

Nationalism colors much of the international and national economic activity in Latin America with anti-U.S. sentiment. Because some of the Latin American countries are the more developed of the "developing" nations, they constitute promising markets for U.S. products. Furthermore, many nations of the region remain sources of raw materials (copper, bauxite) of strategic importance to the United States. However, nationalism may pose a threat to U.S. overseas investments, trade, strategic resources, and rights of passage for both military and commercial vessels.

It can no longer be assumed that favors and facilities will continue to be available despite the fact that the United States has contributed much to improving the quality of the Latin American armed forces. In the past, the United States and Latin American countries have engaged in joint exercises to improve the combat and logistics capabilities of the participants. Also, the United States has supported national security programs in many of the countries in the region. Not only do joint and bilateral defense agreements involving the United States exist, but material support and training constitute U.S. investments for furthering U.S.-Latin American relations (Brown, 1975: 141-143).

Population. Population growth in the Latin American region averages 3.08 percent with 2 of the 21 countries below 2 percent (Argentina and Uruguay). As a result of this high average population growth rate, the populations

of the Latin American countries are projected to increase substantially over the 20-year forecast period. In many cases, the populations of the larger countries are shown to double. Brazil and Mexico remain the two nations in the region with the largest populations throughout the forecast period. In 1995 the population of Brazil approaches 200 million[12] while Mexico reaches 115 million.

Not one of the remaining nations in Central or South America is projected to exceed 50 million in 1995. Population has remained a problem in Latin America for many years and the high growth rate in the region shows few signs of declining. Rapid population growth has been cited as a source of poverty, justification for foreign conflict, political radicalism, and domestic unrest. Hence, unless substantial economic growth occurs, population growth will overshadow material progress and the Latin American countries will, like Africa, experience economic stagnation.

Economic Factors

Domestic Economics. In the past, Latin American countries have experienced a wide range of economic progress from stagnation to accelerated development. Few of the Central American countries appear to be capable of significant economic progress either on past record or in the forecasts. The potential for continued development in South America appears to be rather well-established. Growth is best evidenced by the degree of change in gross domestic product per capita. Although Argentina begins in 1976 with a per capita income of slightly over $1,000 and grows over the 20-year period to more than $2,000 per capita, Brazil experiences an approximate growth rate of 300 percent (from about $500 per capita to about $1,500 per capita).

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[12] Brazil's population growth is in part intentional and based on the belief that population means power. This is not the case in Mexico, however.

Of the three regions, Latin America appears to be the most capable of continuing development. However, several South and Central American nations--Bolivia, Ecuador,[13] Paraguay, Peru, Uruguay, Cuba, Guatemala, Honduras, Jamaica, Nicaragua, and Panama--fail to show progress. Although they are relatively small and apparently strategically insignificant, their proximity to the United States, U.S. economic interests in them, and their international political orientations make them important. The absence of economic growth, due primarily to the continuing high growth in population combined with the history of political unrest, suggests a continuing high level of domestic strife that is not conducive to the maintenance of U.S. interests, be they involved with investment, foreign aid, military aid, or international trade. Also, the projected Latin American environment shows a potential for continued resentment of U.S. presence that could become violent as in the past.

International Economics. Three important factors in international economics are assessed in the forecasts: direction of trade, total volume of trade, and balance of trade between exports and imports. In Latin America, the five largest traders are Argentina, Brazil, Mexico, Venezuela, and the Dominican Republic (an island nation). Chile, Colombia, and Peru also increase their trade significantly over the 20-year forecasting period. The majority of these countries are almost entirely aligned in trade with the United States and remain so during the 20-year forecasting period. Countries with larger and more viable economies demonstrate moderate tendencies toward maintaining greater autonomy from the United States. However, this propensity for independence can be explained by their more established economies that enable them to behave independently in international economics.

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[13] These results were derived from the fact that the data used for generating parameters for forecasting described Ecuador's economy prior to the expansion of its oil industry. Ecuador could show some growth over the 20-year period if oil revenues are wisely invested.

Despite the large volume of total trade (imports plus exports) of some of the Latin American countries, their international economic sectors are less sound.[14] One way to evaluate the strength of a nation's international sector is to look at the balance between exports and imports. Only three countries in the region--Brazil, Mexico, and Venezuela--maintain consistent and significant positive balances of trade. For the most part, the remaining countries reveal slowly declining balances of trade. The unfavorable domestic economic situations forecast for many of the countries in the region, together with these unfavorable trade balances, suggest that the United States will continue to be cited as the cause of economic adversity in the region.

Military Factors

The size of the military establishments in the Latin American countries and the amount of money spent to support them is small compared with worldwide averages. More revealing are the ratios of defense to domestic spending, the change in military manpower from year to year, military manpower to total population, and the percentage of the total gross domestic product spent on defense. Much of the growth in the size of the Latin American defense establishments can be attributed to the aid that they receive from the United States. (See Technical Appendix, Chapter 2.) Only Cuba presently receives aid from the Soviet Union. Of course, the largest Latin American countries maintain the largest armies in absolute terms. This means that Argentina, Brazil, and Mexico devote larger capital outlays to maintain their military establishments. However, because of their large populations, the percentage of the total population in the military is rather small. In addition, the growth potential and modernizing capabilities of these countries in part explain their ability to

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[14] Several reasons for this are often cited. First, at present, the domestic economic situations in many countries make them less than attractive trading partners. Second, tariffs are often imposed to protect infant industries. Third, many nations depend on primary products and trade solely in those areas where they feel they have some comparative advantage.

develop indigenous arms industries that will result in less dependence on the United States for ordnance, small arms, aircraft, and other sophisticated weaponry.

Many small Central and South American countries devote larger amounts of money to their own national security. In part, this projection is a function of the limited growth of their economies over the 20-year range--as GDP growth slows, defense expenditure grows as a proportion of domestic spending. (See Technical Appendix, Chapter 2.) However, a trade-off between defense and non-defense spending necessarily exists. The smaller economies cannot divert monies from development to the acquisition of sophisticated hardware. Therefore, in order to defend themselves they spend less and compensate with military manpower. Thus, manpower growth may be forecast despite declining defense spending. Finally, because the smaller economies cannot supply indigenous arms, they must rely on military assistance whereas Brazil and Mexico can maintain forces largely from their own resources.

International Alignment

As already mentioned, the Latin American countries trade extensively with the United States. However, this is only one dimension of international alignment under study. We are also concerned with the direction and intensity of political alignment in the regions, the extent each type is stabilized, and the total propensity of the less developed nations in each region to align with one of the superpowers. On political alignment, the distribution of votes in the United Nations for many less developed nations tends to follow a North-South orientation as opposed to East-West orientations.[15] Thus, alignment with the Soviet Union does not necessarily suggest

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[15] In general, East-West issues in the United Nations involve these international, political questions on which the United States and the Soviet Union take opposing sides. North-South issues tend to be more economically relevant. Thus, North-South issues usually find the developed nations and the underdeveloped nations taking opposite sides, with the Soviet Union opting in favor of the less developed nations for purely ideological or political reasons. See Alker and Russett (1965: 229-233) for a discussion of the "coincidental" political orientations of the Soviet Union and many less developed nations.

that a less developed nation supports Soviet policies but that the Soviet Union tends to vote with the Third World nations on issues important to the less developed countries, anti-Western, and/or anti-United States. Thus, when a nation appears aligned with the Soviet Union in terms of its U.N. votes, it is revealing its North-South orientation. When the magnitude of its political alignment is high, it is revealing the degree to which it supports Third World issues.

Contrary to most less developed countries, most Latin American countries are politically nonaligned despite the fact that most of them are aligned economically with the United States. Several countries indicate a greater tendency to vote against the developed nations than others, particularly Argentina, Mexico, Panama, Paraguay, Peru, and Uruguay. Cuba, of course, reveals its support of the Soviet Union. Peru, a recent recipient of Soviet military hardware, reveals a gradual tendency to become increasingly aligned in trade and aid with the Soviet Union. Uruguay, on the other hand, demonstrates an initial tendency to become increasingly aligned with the Soviet Union but begins to move back toward the United States in the later 1970's. Both Peru and Uruguay trade more with the Soviet Union. As a result, their projected economic alignment continues this tendency in the future. As constructed, the Latin American model permits this tendency to influence political orientations. Continued economic inroads into each of these nations by the Soviet Union could threaten U.S. interests in the region.

The propensity to align in Latin America is rather high. But there is a marked tendency toward alignment instability as well. Cuba appears to have unresolved incongruities in its alignment components (trade, aid, voting) which it will probably attempt to resolve. But increasing its trade with the Soviet Union will be extremely difficult. Perhaps the only way to eliminate this inconsistency is through rapprochement with the United States that will ultimately result in the support of

U.S. positions in the United Nations.[16] Peru, on the other hand, maintains a balance between the two alignment instability components, suggesting that it suffers little from unresolved alignment orientations. As forecast, Peru will remain oriented toward the Soviet Union and a potential antagonist to the United States.

Alignment instability in several other countries should be mentioned. Panama, a candidate for government change, reveals the tendency to become increasingly unstable as the government becomes more broad-based. The fluctuations in its alignment correspond with government change because government type is a predictor of alignment in Latin America. Therefore, whenever a change occurs, the type of government is substituted into the equation. When voting alignment is predicted, the value reflects the change and it is captured by alignment instability. Brazil, Colombia, and Chile are consistently aligned with the United States both economically and politically. Because of their more developed economic and political systems, Latin American nations are more capable international actors and can assert their independence as time passes. As their economies progress and their political institutions become more experienced, the relative freedom with which they can behave in the international arena will increase.

Conflict

International Conflict. As mentioned earlier, projections of international conflict in the three less developed regions are based on each nation's involvement in past conflict and a tension ratio that describes the expected resources that a nation devotes to defense capability compared to its total resource base. In Latin America, three countries--Brazil, Mexico, and El Salvador--reveal moderate international conflict

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16 Cuba is consistently a candidate for government change on the basis of its high coup propensity. Both alignment instability and domestic turmoil could ultimately combine to resolve both inconsistency and popular unrest.

scores.[17] Since the conflict data are monadic (that is, the values for each country represent the total conflict of each nation), the conflict projections reveal the more conflictful nations in each region. On the basis of identification of key rivals, we suggest that the history of these rivalries will prevail and that traditional "enemies" will be involved in future conflicts. Thus, conflicts between Brazil-Argentina, El Salvador-Honduras, and Mexico-Guatemala may appear periodically through the 20-year projection period. Because they involve nations in the Western Hemisphere, these conflicts are of concern to the United States despite their relatively low intensities.

In Latin America, the tension ratio between resources expended on defense and expected amounts (given the size of the nation's resource base) exceeds the critical value in very few significant cases. The tension ratio for Cuba and Panama reflects a tendency to conflict in the late 1970's but declines in the later part of the forecast. Panama's conflict most likely will involve the U.S. interests in the Canal. In the early 1980's the tension ratio for Paraguay exhibits a high propensity to conflict. This propensity fluctuates at high levels throughout the 1980's but declines after 1990. If traditional rivalries are assumed most likely to reignite, the 1980's should be a period of potential conflict between Paraguay and Argentina.[18] In the mid and late 1980's, Costa Rica and Colombia show temporary flare-ups in their tension ratios,

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[17] The appearance of El Salvador can be attributed to its past conflict with Honduras, driving the famous "football" war. This isolated incident should not be construed as indicative of bellicosity by El Salvador. The conflict score is clearly a function of the reporting and aggregation of three types of conflict (physical violence, coercion, and pressure). Thus, even a high score can consist of words, diplomacy, protestations, and admonitions.

[18] Note that the intensity of the conflict between nations is not forecast by the current models. The conflict projections are based on past conflict plus domestic conditions that have been pressured for international conflict in the past. Thus, the conflict between Argentina and Paraguay may remain at the diplomatic level and never become violent. Brazil would have a tendency to support Paraguay in any such conflict.

suggesting that their traditional rivals--Panama and Venezuela, respectively--may become involved in conflict. However, these flare-ups are only temporary.

On the whole, there is a limited tendency for international conflict among the Latin American nations. This is in part a function of the absence of a recent history of violent conflict in the region and the resulting lack of precedent for use of war to settle political differences.

Domestic Conflict. A variety of government types, ranging from very traditionalist, elitist forms, such as in Haiti, to the more populist and broad-based types found in Venezuela, Mexico, and Colombia, exist in Latin America today. However, the majority of governments are of the elitist-mixed (part civilian, part military) variety.

In the past, Latin America has not been without domestic strife. Many countries have experienced military coups as well as domestic unrest and turmoil. For example, Argentina has experienced a high level of domestic unrest for some time that erupts into nation-wide strikes, urban guerrilla activity, and popular demonstrations. There is little evidence in the forecasts to suggest that the Latin American region will experience less turmoil or elite instability than it has in the past.

Because of the cross-sectional nature of the forecasting models, it is unwise to deal in absolute values for the levels of turmoil or the probabilities of coups. However, it is possible to identify those nations in the region that appear prone to domestic unrest. In Latin America, turmoil is a function of past popular unrest and, to a large extent, the proportion of total economic resources expended on defense. (See Technical Appendix, Chapter 2.) Thus, when the Latin American nations reveal high levels of defense spending, they also manifest high levels of turmoil. The causal linkage in this relationship suggests that the failure to devote expenditures to development results in popular unrest and turmoil

that, in turn, requires extensive military establishments with suppressive capabilities. The nations in Latin America where this appears to be most prevalent are Bolivia, Cuba, Ecuador, Haiti, Jamaica, Nicaragua, Panama, Paraguay, and Uruguay.

The projections suggest that some of the larger, more important countries in the region will experience less domestic unrest than they reveal today. Two cases in point are Argentina and Brazil. Mexico, as one of the larger Latin American nations, also appears to reveal little turmoil. Panama, one of the smaller and more strategically important of the Latin American nations, because of the Panama Canal, exhibits the greatest potential for domestic turmoil throughout most of the forecast period. Clearly Panama has the greatest potential of all Latin American nations for disrupting the mobility of U.S. sea power and directly involving the United States. Of course, Panama's crucial role as a sea link makes imperative imaginative military and diplomatic efforts to resolve the Canal issue equitably.

Strategic Implications of the Latin American Forecast

General. It would appear that the larger and more industrialized nations in Latin America will continue to experience rather rapid economic progress. The smaller, more dependent countries in South and Central America will remain clients of both the larger Latin American countries and those in the developed world. The continuing problem of overpopulation in Latin America makes these developments important if hemispheric stability is to be maintained.

It is highly unlikely that any Central or South American country will avoid some form of domestic political unrest during the 20-year forecasting period. The origins of such violence will be traceable to the pressures placed on the individual nations by their rapidly growing populations, their unresolved urban problems, their past histories of irregular government change, and their inability to distribute material growth

equitably. The nations that are candidates for government change include Bolivia, Cuba, and Panama. Some have strategic raw materials, but all represent potential markets because of their comparatively large consumer populations.

The United States has considerable political, economic, and diplomatic influence in Latin America that can be used to enhance hemispheric security. For example, the continued distribution of both foreign and military aid appears to be the driving force for economic growth, and can be used both to spark economic development and maintain the security of the region. In this connection, the extent to which the United States trades with the Latin American nations is primarily a function of the size of their respective economies. The larger economies will invariably trade more in the international system, and as they trade, include the United States. Growth in the Latin American economies, therefore, can be viewed as contributing to the export sector of the U.S. economy. Thus, the capacity for the Latin American countries to absorb U.S. exports is insured as the United States contributes to the development of the economies in the region. Such international economic activity, however, cannot continue to grow if U.S. trading policies do not recognize the attitudes of the Latin Americans toward past dependence on the United States. Increased diplomatic efforts are required if the sincere interest of the United States in the future of the Latin American economies is to be communicated and accepted.

It is also in the interest of the United States to continue to explore ways to resolve issues regarding the coastal areas around the continent. Efforts of this type should continue in good faith and should encourage the support of the Latin American countries. Should such diplomatic efforts result in equitable solutions for all parties, there is little doubt that U.N. voting will be favorably influenced along with a nation's economic orientations so that international alignment will move into a better balance toward the United States.

With regard to international alignment, however, it is apparent that the potential for continuing Soviet penetration into Latin America exists. The motivation behind this penetration will undoubtedly be political. Those countries that are more antagonistic to the United States must be constantly observed for new evidence of Russian penetration. Of particular interest, of course, are those economically stagnant and politically unstable countries such as Bolivia, Panama, Paraguay, and Peru. Security assistance may be one means of preventing Soviet penetration, for such policies can alleviate continuing domestic unrest or insurgency. However, in the past, U.S. security assistance has been accused of supporting suppressive regimes. Hence, caution is advised.

Finally, the Panama Canal should be mentioned. Panama is a nation that experiences some of the worst living conditions in the hemisphere. (See Technical Appendix, Chapter 3.) The long-range forecasts indicate that this condition will not change. In addition, Panama reveals a high propensity for both domestic and international conflict. Both forms no doubt, if allowed to materialize, will involve American nationals. From a strategic and hemispheric perspective, Panama represents the most significant issue in the region. Because the Panama Canal issue directly involves the United States, the situation must be handled with utmost care through diplomatic channels.

Summary. This section concludes with a discussion of the strategically significant nations in Latin America. (See Table 2.) The first development of interest for the Latin American nations is the apparent trade-off between economic development and military expansion. Two nations with a history of domestic unrest (Argentina, Chile) and Paraguay reveal that, as domestic economic progress is made, some of that development will be diverted to defense spending. In each instance, however, the bulk of this defense spending is likely to be for internal security. Three nations--Brazil, Mexico, and Paraguay--experience both domestic and international economic improvements over time. However, only Brazil and Mexico reveal the kinds of economic stability (that is, balance between economic and military factors) that mark real economic development.

TABLE 2

STRATEGICALLY SIGNIFICANT LATIN AMERICAN NATIONS

Country	Rival	Change in Economic Factors		Change in Military Factors		International Alignment			Conflict Probability			Strategic Importance
		Domestic	Internat'l	DEFX	MILM	Direction	Intensity	Instability	Internat'l	Domestic	Gov't Change	High = H Medium = M Low = L
Argentina	Brazil	+	-	+	+	US	+	0	0	0	0	M
Bolivia	Peru	0	++	++	+	US	--	0	0	+	+	M
Brazil	Argentina	++	++	-	-	MA	-	-	++	0	0	H
Chile	Peru	+	-	+	-	US	+	0	0	++	0	M
Cuba	Dom. Rep.	-	++	0	0	USSR	--	-	0	+	+	H
Mexico	Guatemala	+	++	0	0	US	0	0	+	0	0	M
Panama	Costa Rica	--	++	--	--	US	+	-	0	0	+	H
Paraguay	Argentina	+	++	++	0	US	-	0	0	+	0	M
Peru	Chile	0	--	0	0	USSR	--	-	0	-	0	M
Venezuela	Colombia	+	+	0	+	US	+	0	0	0	0	M

KEY: ++ = High positive change
+ = Moderate positive change
0 = No change
- = Moderate negative change
-- = Severe negative change
US = Aligned with U.S.
USSR = Aligned with USSR
MA = Multi-aligned
NA = Non-aligned

With regard to international alignment, most Latin American countries will remain economically aligned with the United States but will continue to support the Third World in the United Nations. The single country with the capability to act as a multi-aligned nation is Brazil. However, as forecast, Brazil will attempt to bring its economic and political alignments into a better balance. Two nations in the region, Cuba and Peru, remain oriented toward the Soviet Union. At the same time, these two countries show a decreasing tendency to be involved in international relations, suggesting that they will become increasingly isolated in the region but more oriented toward the Soviet Union.

The table indicates little possibility that overt conflict will occur among the Latin American nations. However, one particular triad, the traditional rivalry between Brazil, Argentina, and Paraguay, must be discussed. Brazil reveals a high probability toward international conflict and the position of Paraguay between Brazil and its primary rival, Argentina, suggests that Paraguay may eventually become involved in any violence that might occur. Needless to say, Paraguay will be unable to resist any attempt by either nation to penetrate it.

The projections show four nations with increasing domestic conflict levels --Bolivia, Chile, Panama, and Cuba. The first three of these are also candidates for government change. Cuba and Panama are clearly important to the United States. Should domestic instability in Cuba result in the overthrow of the Castro regime, more stabilized conditions in the Caribbean and in Central and South America could result. Second, the continuing turmoil in Panama is a constant threat to U.S. nationals there and could disrupt negotiations on the future of the Canal.

With regard to the overall strategic importance of the countries in Latin America, two small nations (Cuba and Panama) and one large nation (Brazil) are the most important in the region. This assessment is based on the political, geographic, and military importance of each nation supported by the forecasts.

AFRICA

Background

Upon receiving their independence, many Black African nations[19] opted for non-alignment. As time passed, many of these nations realized the importance of international interactions for growth and became increasingly involved in international organizational activity, especially in the United Nations. Two African states of particular significance are oil exporters--Nigeria and Gabon. Others, still incompletely explored, are believed capable of processing sufficient resources to turn poverty into growth. Some are the least developed of the world's nations.

U.S. involvement in Africa has been primarily in the form of bilateral development assistance, technical assistance, foreign aid, and limited military interaction. Foreign assistance programs have also been implemented by the Soviet Union and the People's Republic of China.

Thus, although the African nations remain ostensibly non-aligned, they are of considerable importance to the three superpowers. Whereas the importance of Africa to the Soviet Union and China is fundamentally politically motivated, the importance of the area to the Western industrial states remains essentially economic.[20] The economic importance of the region is basically twofold; the African nations are sources of strategic raw materials and their populations are potential consumers of U.S. products. Thus, internal or international disruptions on that continent can affect the United States both economically (indirectly) and militarily.

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[19] The African region is defined here as including all of Sub-Saharan Africa including the Republic of South Africa and Rhodesia.

[20] U.S. trade with Africa has increased eightfold since 1960 while investment has increased fourfold. See Kissinger (1975: 3).

The United States is presently involved militarily in only three countries in Africa -- Ethiopia, Liberia, and Zaire. This involvement is primarily concerned with internal security assistance programs. U.S. military personnel, although limited in number, support communications facilities, function as military assistance advisors, and support satellite tracking. Although military presense in Africa is limited, the continent retains its strategic importance because of two geographic areas: the Indian Ocean littoral and the Republic of South Africa. In eastern Africa, the coastal countries become more important as Soviet naval capabilities are expanded in the Indian Ocean, as traffic returns to the Suez Canal, and as the uninterrupted transport of oil to the United States from the Middle East gradually increases. In the south, the Republic of South Africa remains important because of its proximity to the Indian Ocean and the Persian Gulf, its vast supplies of natural resources, and its Western orientation.

Population. The African region presents an interesting contrast to the Middle East and Latin America in that, in general, population growth rates are not unusually high (that is, over 3 percent). In 1976, the first year of the forecast, there are only eight countries with a population greater than 10 million. Each of these has a population growth rate below 3 percent. Nigeria, the African nation with the largest population (64 million in 1976) is expected to grow to 102 million by 1995. The populations of the remaining seven largest countries increase by approximately one-third. One of these, Zaire, with a population growth rate of 3.9 percent, increases its population 100 percent in the 20-year period. The remainder of the African countries manifest rather steady growth patterns.

Economic Factors

Domestic Economics. Economic stagnation has characterized Africa in general for the past 15 years. Only a few countries, such as the Republic of South Africa, Nigeria, Malagasy, and Zaire, reflect any significant growth in GDP. However, when normed by population, GDP begins to reflect

considerable distributional inequality. For example, although Nigeria's total GDP more than doubles between 1976 and 1995, its population also increases approximately 67 percent. This means that although the per capita income in Nigeria increases, it fails to increase in any measurable amount beyond what would be absorbed by inflation. Nigeria, which is expected to grow economically based on an oil export potential, stagnates during the forecast period. South Africa's GDP reflects about a 60 percent increase with about a 60 percent increase in its population. Should inflation continue, it appears that, despite these growth figures, the South African economy will begin to stagnate. The smaller nations with some growth potential and below average population growth rates do reveal economic progress. Nevertheless, most of the African nations remain economically underdeveloped. Other countries, particularly those that receive either U.S. or Soviet aid, are worth examining. For example, Ethiopia clearly stagnates over the entire forecast period. Zaire does experience some growth in GDP but most of that growth is absorbed by an almost 100 percent population increase. In fact, Zaire's progress, compared to most of the other African nations, is less than satisfactory.

Economic growth in Africa can be stimulated by economic or military aid received from the United States or the Soviet Union. Military aid normally plays a positive role in development because of the economic infrastructural requirements that are made necessary by expanding military establishments. This is also the case in Africa, but the amounts of aid must be substantial as Ethiopia's failure to grow suggests.

International Economics. Most of the African nations will continue to experience balance of trade problems. Coupled with stagnating domestic economies, internal domestic instability, food and population problems, inflation, and high levels of political instability, these problems suggest that the African nations will continue to be unattractive investment risks to the developed countries despite their valuable resources. The total amount that the African nations will trade in the future is projected to increase. However, because of inflation, balance of payments

problems, and unstable domestic conditions, no African nation appears to have the momentum to move from a transitional state to a semi-industrialized status. These results suggest that the ability of the African nations to absorb U.S. consumer and capital goods will be limited. From a military perspective, the results suggest that these combined pressures will eventually manifest themselves in intermittent domestic and international violence as the nations compete to secure economic benefits.

Military Factors

Reinforcing relationships exist among defense spending, military manpower, and conflict in Africa. Defense spending is constrained by the availability of total financial resources. Thus, demands for non-defense development spending compete with military and security interests. As forecast, the defense spending of most of the African nations declines significantly during the 1976-1995 period. At the same time, past conflicts influence growth in the size of the African militaries. Finally, a limited contribution to the overall defense capabilities of the African nations is made by military aid from the superpowers. This further indicates the impact of non-indigenous forces operating on military power bases of the African nations. Thus, some positive role is played by foreign military assistance, and military aid may be instrumental in upgrading and modernizing contemporary African militaries.

In Africa, the projected conflict during the forecast period incites manpower growth in most of the Black African nations and Rhodesia. Thus, as conflicts are resolved, growth in military manpower should also decline. For many countries the bulk of the growth in the size of the African militaries occurs during the earlier forecast period when conflict is high (1975 to 1983). After this period, conflict returns to its original range and military manpower responds accordingly.

Three nations--Ethiopia, Nigeria, and Zaire--begin the forecasting period with military manpower levels above 1 million. However, Guinea, Somalia,

and Zaire reveal the highest per capita manpower ratios (8, 8, and 6 percent, respectively). By the end of the forecasting period the percentage of each country's population in the military attains a maximum of 10 percent except Zaire. Finally, although Tanzania's manpower-to-population ratio stays around 2 percent, its military population doubles by 1995.

Defense spending reacts to the projected economic stagnation in the region. Defense spending-to-GDP ratios consistently decline so that by 1995, all nations' ratios are below 7 percent. Clearly, this pattern suggests that, although all of the conditions stimulating manpower growth exist (that is, moderate to high levels of conflict, continuing military aid), economic constraints will force manpower levels to be adjusted downward.

The declining capability of the African nations to support their military establishments financially suggests that requests for military assistance will continue. Given existing legislative constraints on U.S. military aid to Africa, and pending legislation on limitations on arms sales, the developing situation in Africa should become increasingly attractive for more Soviet and Chinese penetration into this region through military assistance.

International Alignment

The majority of the African nations exhibit a tendency toward non-alignment. Since our measures of international alignment attempt to capture the tendency to align with either the United States or the Soviet Union, this finding suggests that the African nations choose to avoid Cold War issues. Additionally, the economic and international political behavior of the African nations tends to be unbalanced. Thus, countries are rarely strictly aligned in both trade and U.N. voting. Alignment in the United Nations with the Soviet Union by the African countries is assumed to be, in part, a function of Russian support for Third World causes--a form of behavior with purely political overtones.

Very few African nations tend to become involved in international relations. Based on the economic situation in many of these countries, their governments are likely to be preoccupied with domestic concerns. At the same time, it should be reiterated that the forecasting model, and the alignment indicators in particular, capture directly only alignment with the United States and the Soviet Union. African colonial histories have locked the region into trading patterns that are difficult to escape. Most African nations continue to trade with their former metropolitan (primarily European) countries.[21] Thus, it is in the U.S. interest to be aware of those nations that demonstrate considerable alignment instability and high propensity to become involved in international relations. This is because anti-European activity that may indirectly involve or implicate the United States is highly possible in the more volatile nations.

The People's Republic of the Congo, Guinea, Mali, Nigeria, Ghana, Somalia, and Uganda all have unstable alignment patterns. Of this group, three nations are of particular interest. Guinea is important because its alignment orientation remains unstable throughout the entire forecasting period, despite Soviet technical assistance to that country (Brown, 1975: 158). Nigeria also remains unstable throughout the forecasting period. Of course, because of its natural resources, particularly oil, this alignment instability is important. Finally, Somalia, whose acceptance of Soviet presence is well-documented, also reveals considerable alignment instability during the forecast period. Those nations that are of particular interest to the United States because they are recipients of military aid--Ethiopia, Liberia, and Zaire--demonstrate rather stable alignment orientations.

In looking at the alignment instability scores, it seems that Africa, as a region, will remain highly unstable even over the long term. However, this is as much a function of former colonial relationships with the European nations as it is an unbalanced orientation toward the United States or the Soviet Union.

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[21] For additional empirical support for this finding see Deutsch and Eckstein (1961), Deutsch, Bliss, and Eckstein (1962) and McIlroy (1974: Chapter 3).

Conflict

International Conflict. Throughout the forecasting period, four African nations--Gambia, Guinea, the Ivory Coast, and Ethiopia--demonstrate high levels of international conflict. No other country exhibits a tendency for as much conflict during the 20-year period. Of this group, Guinea and the Ivory Coast are historical rivals. Thus, one should expect continued tension between them. Ethiopia and Somalia have histories of conflict as do Nigeria and Ghana.

In Africa, as opposed to Latin America or the Middle East, conflict is forecast regardless of the size of the tension ratio. Thus, the tension ratio does not appear to be a useful predictor for Africa. This result may occur because most international conflict in Africa can be attributed more to tribal conflicts than to official international political confrontations that would require mobilizing the public. Thus, when such conflicts arise, the diversion of domestic resources to defense is less than would occur in Latin America or the Middle East.

Domestic Conflict. Although certain countries are of little economic or military value, they may be of considerable importance as political friends or enemies. Many of these countries, however, are of little strategic value to the United States or the Soviet Union per se. But, as regimes change, so do political and ideological alignments of nations.

As discussed earlier, domestic political instability is measured by a coup propensity index and a measure of turmoil. Both of these variables are monitored as the forecasting progresses from one year to the next. When a country's value exceeds a coup threshold, it becomes a candidate for government change. Of the total number of countries that appear to experience government change during the 20-year forecasting period, the African nations are the largest group represented (20 out of 33). Of this group, all are recipients of some form of U.S. aid (in the base year 1970) except for the People's Republic of the Congo, Rhodesia, and Zambia. Three in particular--Ethiopia, Liberia, and Zaire--receive U.S. military assistance.

There is little evidence that the level of political unrest will decrease in these countries. Of those with particular strategic importance (either as a source for strategic materials or for geographic reasons) Rhodesia, Somalia, Zaire, and Nigeria appear to be particularly coup-prone. Because of U.S. interests (economic, military, and political) in all the African countries, political instability poses particular problems for maintaining those interests and protecting American lives in these turbulent areas. Political instability in the African nations is expected to manifest itself in both elitist and mass unrest. This is fundamentally a function of the past history of domestic instability in Africa. Thus, as the forecasts move into the future, the level of turmoil grows and, at the same time, the probability of coups remains high in many of the African states.

Strategic Implications of the African Long-Range Forecasts

General. Probably the most important aspect of the entire African region with strategic implications is the projected failure of the African nations to achieve substantial economic progress. Whether real or imagined, the sources of this failure will no doubt be cited as the responsibility of the developed world. In this connection, the United States and the European nations can anticipate continued incendiary rhetoric in the forums of international politics such as the United Nations. Negative balances of trade will invariably incite accusations of economic exploitation, manipulation, and neo-colonialism. Unless this is recognized by the United States as a continuing potential source of anti-U.S. behavior, little progress can be made toward acquiring and/or maintaining allies on the African continent. Therefore, nations where the United States has interests, such as Ethiopia, Rhodesia, Nigeria, South Africa, Zaire, and even Somalia, should be cultivated with this problem in mind. Because of the significance of these nations and the expected domestic and international instability that is forecast, emphasis should be placed on the development of policies and plans (involving intelligence gathering, military assistance, logistics and supply, and evacuation).

Africa will continue to exhibit the growing pains it has shown the world for the past 20 years. And the Soviet Union can be expected to exhibit an aggressive foreign policy toward the nations in that region. Soviet involvement in Africa has been based primarily on political maneuvering to acquire support for Socialism. However, the United States is involved in the majority of nations in Africa through foreign aid and technical assistance. Most African nations have recognized that the United States can contribute more to their development than the Soviet Union. Foreign aid, therefore, can be a way these nations can increase their involvement in international relations and solidify their alignment toward the United States.

As nations throughout the developing world continue to express their discontent with North-South issues, the United States must be prepared to deal with these issues in an honest fashion, recognizing that the interaction between international politics and economic development is characteristic of contemporary international relations. And our policies toward the African nations should expressly deal with this recognition.

Other strategic implications should be recognized. These include the possibility of domestic turmoil within Rhodesia and South Africa as well as a number of Black African nations. Although the levels of turmoil in Rhodesia and South Africa are currently negligible, the United States has dual concerns for the future of each nation--first with regard to human rights and second with regard to needed strategic materials such as chromium. Both of these countries have the potential for violence, insurgency, and even civil war that would almost inevitably involve the United States in a role similar to the one it has played in defusing the Middle Eastern situation.

The constant, moderate level of conflict in the region (higher than that for Latin America but lower than that for the Middle East) and the history of ethnic and tribal conflict suggest that the potential for intermittent conflicts will continue to attract attention to this emerging

region. Thus, although the United States and Soviet Union can expect little influence in Africa, racial, tribal, and even anti-colonial violence could involve them in a Vietnam-like situation. Whether or not such an overt confrontation materializes, the level of conflict and the rivalries in the region make Africa a potential international tinder-box demanding constant monitoring and a capability for rapid response, quick mobility, and maintenance of air and sea links for crisis management in the region.

Summary. Table 3 presents the forecast results for 12 strategically significant African nations. The results of the economic forecasts suggest that little progress will be realized in the African region over the next 20 years. In fact, most countries are expected to stagnate or degenerate economically. The absence of economic resources clearly impacts on the military sectors such that defense spending increases in only two nations, Ethiopia and Somalia. Thus, augmenting existing armies with military manpower seems to be the only way the nations can maintain their defense capabilities. It appears that the nations in Africa can not support a growing military establishment without some form of military assistance. That assistance ceilings have been imposed on aid to the African nations means that any increase in military assistance to Africa will most likely go to those nations already supported (Liberia, Ethiopia, and Zaire) by the United States. Any additional influx of aid will necessarily come from Europe, the Soviet Union, or the People's Republic of China. Both China and the Soviet Union have demonstrated an interest in the African region since the early 1960's. Hence, the conditions for future penetration by these two superpowers are present and highly likely in Africa. One additional condition that suggests the viability of this conclusion is that most African nations continue to be non-aligned throughout the forecast. Only three nations, Guinea, the Ivory Coast, and the Republic of South Africa (hardly a typical Sub-Saharan nation), exhibit increased involvement in international relations beyond their current levels. All of the other African nations included in the table tend to become increasingly isolated from international politics and economics.

TABLE 3

STRATEGICALLY SIGNIFICANT AFRICAN NATIONS

Country	Rival	Change in Economic Factors		Change in Military Factors		International Alignment			Conflict Probability			Strategic Importance
		Domestic	Internat'l	DEFX	MILM	Direction	Intensity	Instability	Internat'l	Domestic	Gov't Change	High = H Medium = M Low = L
People's Rep. of Congo	Zaire	0	0	--	++	NA	-	+	+	++	+	H
Ethiopia	Somalia	-	--	+	++	NA	-	+	0	++	+	H
Ghana	Nigeria	0	-	0	0	NA	-	+	0	0	0	L
Guinea	Ivory Coast	+	0	0	+	NA	+	-	0	0	+	H
Ivory Coast	Guinea	0	-	0	++	NA	++	-	+	0	+	H
Kenya	Somalia	0	-	0	0	NA	-	-	0	+	+	L
Liberia	NONE	0	0	--	++	NA	--	+	0	++	+	M
Nigeria	Ghana	0	--	-	+	MA	-	0	-	-	+	M
Rhodesia	Tanzania	-	--	0	+	NA	--	+	+	0	+	M
Somalia	Ethiopia	++	0	+	0	NA	+	+	+	+	+	H
Rep. of South Africa	Tanzania	0	-	0	0	US	0	0	0	0	0	H
Zaire		+	++	-	++	NA	--	0	-	++	+	H

KEY:
- ++ = High positive change
- + = Moderate positive change
- 0 = No change
- - = Moderate negative change
- -- = Severe negative change
- US = Aligned with U.S.
- USSR = Aligned with USSR
- MA = Multi-aligned
- NA = Non-aligned

Three international conflict dyads are particularly interesting--the People's Republic of the Congo-Zaire, Ethiopia-Somalia, and Guinea-Ivory Coast. There are several international and domestic conditions that impinge on each dyad throughout the forecasting period. First, at least one member of each dyad experiences some domestic economic progress during the forecasting period. For example, although defense expenditures can be shown to increase for both Ethiopia and Somalia, only Somalia can really afford such expenditures. Second, military manpower increases for at least one member of each dyad during the forecasting period. Third, at least one member of each dyad reveals an increased propensity to conflict with its former rival. Fourth, every country experiences increasing levels of domestic conflict and all, at one time or another, become candidates for government change. Finally, either the United States or the Soviet Union is influential in one or the other member of each dyad. The Soviet Union has an ideological foothold in the People's Republic of the Congo while the United States provides foreign aid to Zaire. The United States supports Ethiopia in a similar fashion and at the same time supports the communication facility at Asmara in Ethiopia. The Soviet Union's ongoing support to Somalia's military forces has been well-documented. In the third dyad, the Soviet Union has been providing similar support in Guinea and has basing rights there. Thus, because of the interests of the superpowers and the domestic and international conditions that are projected for the six countries, all contribute to the potential for superpower involvement in African crises.

As a result of these assessments and the domestic and regional conditions projected for Africa, we have evaluated the strategic importance of the nations cited. Of course, these nations have been evaluated and identified as highly important because they have the potential for engaging the major powers in their problems. This potential must be continuously monitored if policy and planning with regard to Africa are to be formulated with maximum efficiency and impact.

SUMMARY

This chapter has reviewed the standard forecasts for the three less developed regions--the Middle East, Latin America, and Africa. Each regional subsection was divided into six parts: background, economic factors, military factors, international alignment, conflict, and strategic implications. Each section discussed the implications of the long-range forecast for each region for future domestic political and economic situations. International relations of the key countries in each region, such as international trade, international alignment, and international conflict, were also discussed. These discussions of the future environments of each region suggest the following points:

- The Middle East will remain the most volatile area of the three studied. Accelerated economic growth will be experienced by some of the larger nations but many of the smaller nations will remain stagnant and underdeveloped. Economically, the oil-exporting nations have the potential for rapid economic growth if deliberate policies to reduce Western oil dependency do not disrupt progress. Regarding conflict, the area will continue to experience hostilities among all actors in the region in the future. Traditional Arab rivalries invariably will reignite and conflict will occur between Israel and its neighbors. The nations in the region demonstrate, and will continue to demonstrate, a propensity to align themselves with either superpower. Those that are unstable in their alignment are invariably the actors whose economic sectors attract them to the West for imports and exports. However, their political orientations remain with the Third World, specifically with regard to North-South issues that involve the international division of labor and the plight of the less developed nations.

- The long-range forecast for Latin America reveals considerable potential for all, and accelerated economic growth in only the larger nations, such as Argentina, Brazil, and Mexico. The tendency for continued alignment with the United States remains high with only a few nations behaving as independent actors. Some of the smaller nations, such as Cuba, Panama, and Bolivia, will experience continuing high levels of domestic instability. Little international conflict is forecast except for

those nations, Brazil and Mexico, that have experienced hostilities in the past.

- The forecast for Africa reveals that the region will remain economically stagnant. Domestic politics will remain turbulent and many of the nations in the region will remain candidates for government change. International conflict levels will remain moderate. And many of the nations, including those in which the United States has vested strategic interest, will remain unaligned with either superpower.

CHAPTER 3. OVERVIEW OF THE FORECASTING METHODOLOGY

This chapter presents a non-technical overview of the model, the rationale behind the reoperationalization of the five central environmental descriptors (national power base, international alignment, international trade, international conflict, and domestic stability), and the respecification of the equations by which the descriptors are forecast. This section covers four major areas.

- Differences between the European nations and those of the Middle East, Latin America, and Africa in the political, economic, military, international alignment, and conflict areas, both within and between countries.
- Reoperationalization of the five central environmental descriptors and the importance of change measures for each forecast variable.
- The introduction of policy-sensitive exogenous predictor variables that allow the manipulation of the standard forecasts.
- Structural and technical changes in the regional models that make them different from earlier models.

Each study done by CACI for JCS/J-5 has kept the central environmental descriptors essentially the same because of their importance to strategic policy and planning. However, differences between Europe and the less developed nations require adjustments in the operationalization and forecasting equations for projecting political, economic, military, and social variables for the nations in the Middle East, Latin America, and Africa. Discussions with JCS/J-5 representatives also underscored the need to direct attention to specific attributes and behaviors characteristic of each country and region so that the subtle strategic implications important to writers of the JLRSS would not be obscured.

GENERAL DIFFERENCES BETWEEN EUROPE AND THE LESS DEVELOPED WORLD

The structures that link important environmental variables in the European nations differ little from country to country. There is much more variation among the nations of less developed regions, especially in terms of the relationships among important environmental variables and with respect to the volatility, or variation, in less developed country behavioral relationships.

For example, even though income levels, industrialization, and urbanization vary within the European nations, their basic economic structures are similar (see McIlroy, 1974: 131-134). Thus, while the values for the European nations may differ, the variables interrelate in patterns similar enough to permit the construction of a generalized regional model that produces meaningful forecasts.

In contrast, in the Middle East, Latin America, and Africa, variables often interrelate in different ways, making a generalized model difficult to construct. For example, it is generally acknowledged that the Latin American nations have rather well-established economic infrastructures compared to the traditional, agriculturally based economies of the African nations. Therefore, indigenous capital investment in Africa (a component of gross domestic product) contributes less to a nation's total GDP than in Latin America due to the unavailability of capital in the former region. These factors need to be captured in order to generate accurate forecasts and each region must be independently modeled to project the substantive idiosyncracies within each region over the long term.

The developing countries are invariably characterized by marked differences in other areas of economic behavior that are very similar in the more developed nations of Europe. For example, the Middle Eastern nations clearly depend at this time on oil exports for revenue and development capital. Thus, the trading sector contributes far more to the per capita wealth of the region than in Africa or Latin America. Consequently, the

international economic sector should be specifically included in the models so that such differences can be forecast. Earlier forecasting efforts dealt only with economies from an aggregate point of view.

Aggregate models would also obscure the origins of defense spending and military manpower in the three regions. In Latin America, the suppression of domestic unrest would appear to justify defense expenditures and large militaries whereas in the Middle East and Africa the propensity for international conflict would no doubt explain defense spending.

Other factors would be obscured, or misrepresented, by more general models. Urbanization derives from substantially different forces in the Third World than in the West. Domestic conflict, in the form of coups and domestic turmoil, is more prevalent and originates from economic conditions as well as political situations. International conflict and international alignment both derive as much from the influences of economic as political forces and often within an environment that involves competition between the Soviet Union and the United States.

An additional important difference between the European and the less developed regions concerns the role of the military in political affairs. Many nations in all of the less developed regions are dominated by military regimes that have gained power, more often than not, by coups d'etat and often retain power by sheer coercion. The implications of the military role in politics in many of these nations are far-reaching and extend into the economic and social sectors of the nation as well as into foreign policy (Lieuwen, 1965; Janowitz, 1964).

Another distinguishing characteristic that must be considered in modeling the Middle East, Latin America, and Africa involves the importance of the international economic sectors of the nations. That is, international trade and trade dependency are extremely influential determinants of both economic and political stability and growth (McIlroy, 1974; Jenkins, 1972; Horowitz, 1972; Galtung, 1971). At the same time, however, these conditions are often a source of anti-foreign behavior. The role of the

international economic sector as a source of income (from exports) and as a cause of balance-of-trade problems (from imports) remains a highly sensitive issue between the Third World and the developed nations.

The foregoing discussion identifies the specific demands made on any effort to build forecasting models for less developed regions: (1) the operationalization of the five central environmental descriptors in ways that are sensitive to the characteristics of the specific regions, (2) the selection of appropriate independent variables for predicting the central descriptor variables and the specification of their interrelationships, and (3) the identification of forecasting parameters that produce realistic forecasts while remaining flexible enough to capture the volatile nature of many Middle Eastern, Latin American, and African nations.

REOPERATIONALIZING THE FIVE CENTRAL ENVIRONMENTAL DESCRIPTORS

The first change made necessary by modeling each region involved reoperationalizing four of the five central environmental descriptors. First, because of the complex process of economic change in the three Third World regions, the national power base concept was broken down into three components (see Figure 1) -- resource power, economic power, and military power. This is in contrast to the conceptualization for the European model which considered only economic and military power bases (CACI, 1974). The measures used in the earlier model were designed to capture the technological bases of the European nations as they affect economic and military capabilities. In the Middle East, Latin America, and Africa, technology per se plays a limited role in determining the relative power of nations. Therefore, to map national power base effectively, the economic component was decomposed into the specific variables that describe the complex of economic processes such as private consumption, investment, government spending (defense and non-defense), and exports and imports.

The second reoperationalization involved improving the domestic instability descriptor. Two indicators, a coup propensity indicator and a turmoil

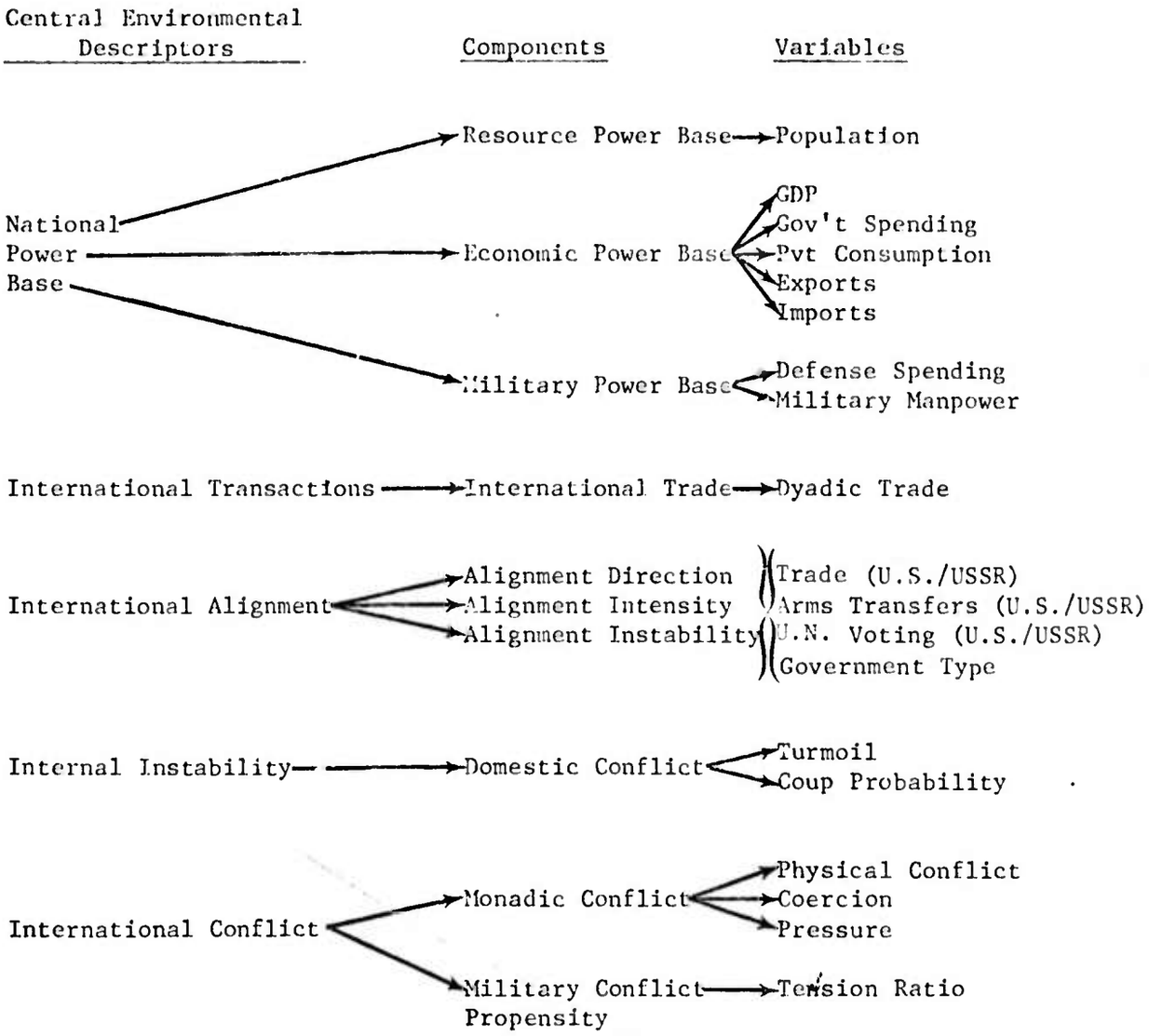


Figure 1. Central Environmental Descriptors, Components, and Variables for the Middle Eastern, Latin American, and African Models

variable, were used here. The coup propensity indicator measures a nation's history of irregular government changes. It focuses on a nation's history of military takeovers and measures the propensity for violence that results from elite discontent in many developing countries. This kind of violence is generally absent in Europe but is both frequent and significant in each region studied. The turmoil variable, also used in the European model, was redefined to represent better popular unrest in Third World countries and to permit the use of more theoretically grounded relationships for forecasting domestic instability.

The third change dealt with international alignment. This descriptor was enriched by adding (1) arms flows, (2) international trade with the United States and the Soviet Union, (3) foreign aid, and (4) government type to U.N. voting patterns (used in previous research). These inclusions were designed to capture the complexities of the international orientations of the less developed nations. In addition, these components were used to develop a measure of alignment instability that is based on the theory that the international alignments of Third World nations are characterized by considerable dissonance and that unstable nations attempt to resolve the incongruities over time by moving toward one pole or the other on all of the alignment indicators.

Next, the international conflict descriptor had to be altered due to the scarcity of data for the three regions under examination. The dyadic conflict variable used in the European model was replaced by two measures: a monadic conflict variable that indicates a nation's total conflict and a tension ratio that indicates the propensity of a nation to conflict on the basis of the discrepancy between the nation's actual defense spending and its expected defense spending given the size of its GDP. These two variables can be used in combination with the identification of each nation's rival to forecast the most conflict-prone dyads.

Finally, international trade was disaggregated into U.S. trade, Soviet trade, and total trade for each country in each region. These variables

measure the international economic leverage of the United States and the Soviet Union in each country and show the extent to which a country is involved in the international trading system.

All of the variables included in the current forecasting project are shown in Table 1. The variables that appear under the heading "Endogenous Variables" are predicted within each regional model. Thus, they enter into the forecasting process as variables that directly predict an environmental descriptor or as variables that predict other variables instrumental to the prediction of an environmental descriptor.

An additional change complements these improvements. In addition to reoperationalizing the central concepts and expanding the data base for the study, the focus is now on the direction and degree of change that occurs in a forecast variable from one year to the next. Thus, the real substantive concern of the current study becomes the change that is reflected from one time to another in the variables being forecast and not simply the projected values, their distributions, or rankings. This new perspective is important because it allows the implications of rates of change to be compared for strategic policy and planning. Thus, comparisons between nations and regions can be made on economic growth, changes in military expenditure, movement toward or away from domestic stability, shifts in alignment patterns, and so on.

For example, most African nations have progressed economically at a slower rate than the Latin American countries. However, this may not be the case in the future. The Middle Eastern nations, on the other hand, are now capable of fairly rapid growth but remain nearly as underdeveloped as many of the African nations. By looking at rate of change rather than static measures of social, political, and economic phenomena, a dynamic is introduced that is absent from earlier forecasting models.

TABLE 1

Comparison of the Variables Used in Previous and Current Forecasting

Europe	The Middle East, Latin America, and Africa	
	Endogenous Variables	Exogenous Variables
Population	Population	Arms Trade with U.S.
Energy Consumption	Gross Domestic Product	Arms Trade with USSR
Gross National Product	Non-defense Government Spending	Military Aid from U.S.
Dyadic Trade	Total Imports	Military Aid from USSR
Alignment Distribution	Total Exports	U.S. Economic Aid
Alignment Intensity	Dyadic Trade	USSR Economic Aid
Turmoil	Defense Spending	U.S. Cooperative Behavior
Revolt	Alignment Intensity and Distribution (Trade)	USSR Cooperative Behavior
Defense Expenditure	Alignment Intensity and Distribution (Votes)	
Military Manpower	Composite Alignment Intensity	
Monadic Conflict	Alignment Instability	
Dyadic Conflict	Turmoil	
	Coup Propensity	
	External Conflict (by Nation)	
	Military Conflict Propensity	
	Government Type	
	Urbanization	
	Literacy	
	Employed in Non-Agriculture	
	Imports from U.S.	
	Exports to U.S.	
	Imports from USSR	
	Exports to USSR	

INTRODUCING POLICY-SENSITIVE EXOGENOUS PREDICTORS FOR SIMULATIONS

The variables labeled "Exogenous Predictors" in Table 1 are not predicted by the models. They are included because they are theoretically appropriate and describe activities that reflect political decisions that can be simulated. Thus, the amount of military aid to a country can be adjusted to reflect improved relations between two nations. This change in military aid can, in turn, affect other variables such as defense spending, GDP, and international trade. In this way, the impact of shifts in policy on the entire system of equations and on the final forecasts can be assessed.

The exogenous predictor variables permit the analysts to simulate the impact of the United States and the Soviet Union on the forecasts for the three regions. Some of the variables measure U.S. and Soviet arms trade with the nations in each region while others measure military and foreign aid and cooperative behavior. Each of these variable is exogenous to each forecasting model and can be manipulated in either of two ways. First, the degree or the amount of U.S. activity (arms transfers, aid, and so forth) can be altered before forecasting begins to determine the impact of increases or decreases in such activity on the projected environment. Second, any parameter defining the impact of an exogenous predictor variable can be changed to give the variable greater (or lesser) power in causing proportional changes in the dependent variable being forecast. This inclusion introduces great flexibility and allows simulations of alternative future environments to be generated.

The inclusion of exogenous variables permits the comparison of different policies of the United States and the Soviet Union. Does an increase in Soviet trade with a group of African nations have a greater impact on international alignment than it would in Latin America? What is the impact of increased or decreased exports as a result of an embargo (simulated) on growth in the Middle East? These and many other similar questions can be asked and answered by introducing exogenous variables that can be manipulated by the JCS/J-5 analyst.

CHANGES IN MODEL STRUCTURE

Each regional forecasting model consists of 18 forecasting equations. Although the equations, as they are designed, are generally applicable to representative developing nations, the set of equations was tested and estimated for each region. This means that parameters estimated for forecasting the configurations of political, economic, military, and social variables were generated for each region. In this way, the structural differences of each region are captured by a single general model structure. This is to say that the influence of certain predictors differs substantially from one region to the next.

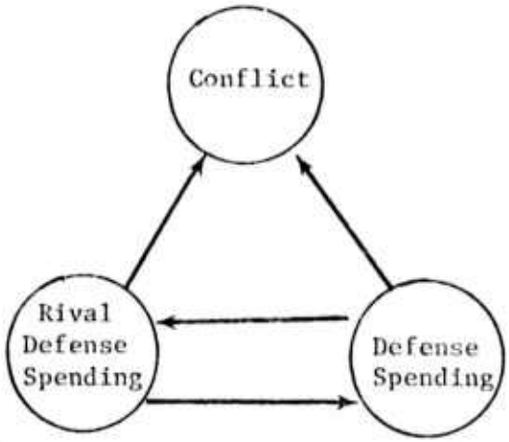
This alteration is actually one of technique rather than substance. The structure of the general forecasting model is presented in its entirety in the Technical Appendix.[1] Each equation in the model was tested individually for each region. There are good reasons for this procedure. For example, although variables were included in an equation for either theoretical or empirical reasons, the impact of each remained an empirical question to be answered by the testing process. Since the tests were applied to each of the three regions, region-specific coefficients were generated. Thus, a parameter that has no impact in one region may have substantial impact in another.

As an example of what is meant here, consider the findings shown in Figure 2 for Latin America and the Middle East. The figure describes the results of testing the following equation for each region.

$$\Delta DEFX_{t,t-1} = \beta_{9,0} + \beta_{9,1}\,\Delta RIVDEX_{t-1,t-2} + \alpha_{9,2}\,(DEFX_{t-1}/GDP_{t-1}) + \beta_{9,3}\,COOP_{t} + \alpha_{9,4}\,\Delta\frac{GDP}{POP}_{t-1,t-2} + \alpha_{9,5}\,CONF_{t-1} + \beta_{9,6}\,\frac{\sum_{i=1}^{5} MILA_{t-i}}{5}$$

[1] See Technical Appendix, Chapter 1 for the complete model structure.

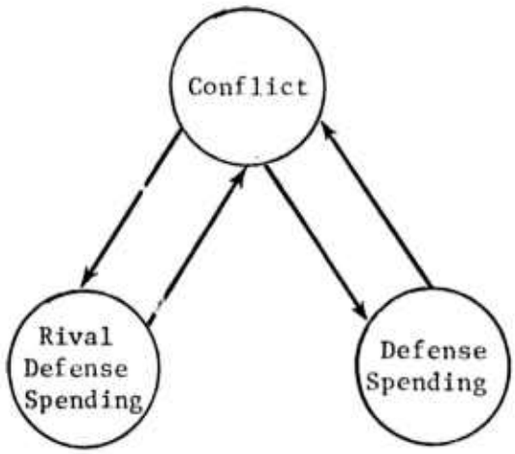
LATIN AMERICA



$$\Delta DEFX_{t,t-1} = -1.05 + .20 * \Delta RIVDEX_{t-1,t-2} - 27.68 * (DEFX_{t-1}/GDP_{t-1})$$

$$+ .01 * \Delta\frac{GDP}{POP}_{t-1,t-2} + 5.26 * \left(\frac{\sum_{i=1}^{5} MILA_{t-i}}{5}\right)$$

MIDDLE EAST



$$\Delta DEFX_{t,t-1} = -7.29 - 13.84\ (DEFX_{t-1}/GDP_{t-1})$$

$$+ 7.85 * CONF_{t-1} + .08 * \Delta\frac{GDP}{POP}_{t-1,t-2}$$

$$+ .73 * \left(\frac{\sum_{i=1}^{5} MILA_{t-i}}{5}\right)$$

Figure 2. Comparison of the Origins of Defense Spending in Latin America and the Middle East

where:

DEFX = defense spending of actual or potential adversary nations.

RIVDEX = rival's defense expenditures.

DEFX/GDP = percent of GDP spent on defense.

GDP/POP = gross domestic product per capita.

COOP = cooperative behavior from U.S. and USSR.

CONF = an aggregate of pressure, coercion, and physical violence.

MILA = A 5-year moving average of military aid in U.S. dollars from the superpowers.

Our general conclusion is that, in Latin America, conflict is not an important intervening variable that links rival defense spending and a nation's defense spending. Arms races can be shown to exist in Latin America independent of international conflict in that region. In contrast, in the Middle East, the linkage between rival defense spending and a nation's defense spending is essentially a function of conflict. Thus, although the same equation was used in all three regions to estimate the parameters that generate the regional projections, different parameters result from the use of region-specific data. Consequently, substantially different models with distinct sets of important variables and parameters for each of the three regions are developed.

Figure 2 presented a simple case with rather clear implications. First, in the Middle East, ongoing arms races feed conflict, conflict feeds defense spending, and that, in turn, is viewed by rival nations as escalation. The policy implications for this classic positive feedback suggest that the continuation of arms flows into the Middle East is almost certain to increase the probability of overt, violent conflict.

By contrast, in Latin America, overt violence has been almost negligible. However, the probability of conflict increases as arms races continue.

This phenomenon cannot be understood by a simple forecast that relies only on one set of assumptions. However, if other variables, such as military aid, are introduced into this set of relationships by arbitrarily assigning a positive weight to them, the impact of military aid or sales to Latin America on conflict can be assessed.

SUMMARY

This chapter has provided a brief overview of the regional forecasting models and the changes that have been necessary to build a system of equations that accurately reflects the many nuances that characterize the less developed regions. In building such a model, the differences between the developing and developed nations were taken into account and led to significant differences in interpretation and conceptualization of the five central environmental descriptors. Finally, the alterations to the overall model structure were described and three specific innovations elaborated. They were (1) emphasis in the model on rates of change over time, (2) focus on the influence of the United States and Soviet Union on the less developed regions, and (3) generation of three unique regional models from a general model structure.

This last improvement allows three separate models to be developed easily from a single computer model while realistically capturing the regional differences of importance to long-range forecasting of strategic policy and planning. Again, it should be emphasized that this approach adds considerable dynamism to JCS/J-5's long-range forecasting capability and paves the way for additional innovations that should advance that capability even further.

The forecasts described in Chapter 2 were generated from the standard forecast models for each region. In each case the assumptions built into the model and the specified interrelationships among the variables in the models permit the projections to be made. Although the standard

forecast can capture and identify the interplay among forces in each region, it is unable to identify the impact of changes in each superpower's behavior toward a specific region. In order to understand better the impact of U.S. or Soviet behavior toward the Middle East, Latin America, and Africa, policy sensitive variables were included in the equations so that JCS/J-5 analysts could adjust the values for each behavior and simulate the impact of those changes on the future of each region. The interpretation of these simulations is basically the same as for the standard forecast with one significant difference. Each simulated alternative future will produce different forecast results for specific variables. These, in turn, will reflect the impact of U.S. and Soviet policy toward certain countries in the region or to the region as a whole depending on the alterations. The next chapter discusses the three simulations that were generated after U.S. and Soviet policies were changed. Each simulation is treated separately and contrasted with the standard forecast described in the preceding chapter.

CHAPTER 4. SIMULATING POLICY CHANGES TOWARD THE MIDDLE EAST, LATIN AMERICA, AND AFRICA

This chapter discusses, in non-technical language, the three sample simulations that were carried out for the Middle East, Latin America, and Africa. A detailed discussion of each simulation appears in the Technical Appendix, Chapter 4.

The chapter is divided into two parts. The first part presents a brief and general introduction to the simulation capability that has been built into the long-range forecasting models. The second part describes each simulation. It identifies the shifts in assumptions that guided the operational changes made in the policy variables and compares the impact of these changes with the projections generated by the standard forecasts. Finally, the policy implications of the simulated forecasts are assessed to provide the JCS/J-5 analysts with examples of the relevance of long-range simulations for strategic policy and planning.

INTRODUCTION TO SIMULATION

The current forecasting models for the Middle East, Latin America, and Africa are designed for two specific purposes. First, the models are used to generate standard forecasts for all of the nations under study. These projections, then, can be used to compare nations in a region to assess the implications of the projections for policy and planning, assuming that the relationships among the variables in each model remain unchanged in the future.

The second purpose of the current forecasting model is to provide the defense community with a long-range simulation capability that permits changes in assumptions to be operationalized so that alternative forecasts can be generated and the implications of the changes assessed from a strategic policy and planning perspective.

The simulation capability is exogenous to each regional model and permits the values of U.S. and Soviet cooperative behavior,[1] military aid, and arms sales to be altered by the analyst. Thus, when one wishes to assess the impact of policy shifts, such as the discontinuation of U.S. military aid to a nation, the values for this measure can be physically altered for any year beyond 1975. Then, the forecast is run in the same way as the standard forecast. Subsequent to the changes and their projection, the new forecasts can be compared to the standard forecast for each region to observe the differences generated by the simulation. Finally, if major shifts are observed, they can be traced back to the specific changes that were made prior to the simulation. In this way the implications of the policy shifts on future regional environments can be evaluated.

This innovation enables the JCS/J-5 analyst to use the Middle East, Latin America, and Africa in a number of ways.

- Each region can be simulated individually to generate a range of comparable alternative futures.
- JCS/J-5 can evaluate the strategic implications of proposed legislation that would impact on DoD policies on military assistance.
- U.S. reactions to major international decisions that confront the United States with unfriendly environments can be simulated.
- Soviet policies that are designed explicitly to penetrate the nations of the Middle East, Latin America, and Africa car be simulated by using cooperation, military aid, and arms sales as surrogate measures of international political influence.

The key to interpreting the simulations is comparison. No forecast stands in isolation, and simulations are forecasts. But, because simulations describe the impact of alterations in policy variables, they necessarily must be compared to some benchmark if the implications of the changes are to be

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[1] These data are a weighted combination of international events representative of interactions between nations that are fundamentally friendly.

meaningful. This benchmark, of course, is the standard forecast for each region that assumes no policy changes. Any time the simulation capability is used, the projected values take on meaning only when they are compared with either the standard forecasts or simulated forecasts, the assumptions and justifications for which are known and understood.

SIMULATING POLICY CHANGES IN THE MIDDLE EAST, LATIN AMERICA, AND AFRICA

This section describes the three sample simulations generated for each region. The simulations that were selected are based on plausibility, relevance to contemporary international relations, and impact on variables that are of particular interest to JCS/J-5.

The Middle East

Simulation Strategy. The policy changes that were simulated for the Middle East stem from two basic assumptions. First, progress toward resolving Egyptian-Israeli differences is assumed to continue. Second, the spirit of detente is expected to encourage cooperation between the United States and the Soviet Union. These two conditions set the stage for the reduction of U.S. and Soviet arms sales and military aid.

Seven countries were selected for the simulation of the reductions: Egypt, Israel, Iraq, Jordan, Lebanon, Libya, and Syria. These nations were chosen because of their continuing involvement in Middle East conflict. In addition, all Arab nations have espoused anti-Israeli positions, incurred high defense expenditures, received military aid, and purchased arms from a superpower. Specifically, the levels of military aid and arms sales from the United States and the Soviet Union to the seven countries were reduced by 50 percent (of their 1970 base-year levels) in 1976. Then, in 1977, both variables were reduced another 50 percent. No further changes were made and the simulation was allowed to run to 1995 with the values of military aid and arms sales at the reduced level, 25 percent of the 1970 level.

These reductions were expected to affect indigenous defense spending in the Middle East and, because of the structure of the Middle East model, to affect other sectors as well. As mentioned in Chapter 3 of the Technical Appendix, expanding defense establishments demand growth in the economic sector so that financial support for large militaries is available. Therefore, if military assistance is denied the Middle Eastern nations, defense spending should decline and this should be reflected in reduced economic growth.

The reduction in military assistance may also impact on Middle Eastern arms races. When the size of a nation's defense establishment grows, it inspires growth in the defense capability of the nation's primary rival. Thus, a reduction in military assistance was expected to decelerate Middle East arms races accordingly.

Finally, in the Middle East, defense spending is a function of conflict (see Chapter 3 of the Technical Appendix). Therefore, conflict was expected to decline as military assistance was reduced.

Findings. Most of our expectations materialize as a result of manipulating the military aid and arms sales variables. However, there were some interesting and unexpected findings. First, the impact of reduced military assistance is felt in the defense and economic sectors of those nations that receive large amounts of military aid from either superpower. The forecasts for those nations that receive small amounts of aid remain virtually unchanged. Thus, the nations that depend on large amounts of aid to support their defense establishments suffer damage to their economies when aid is terminated.

In addition to affecting the absolute levels of GDP and defense spending, reducing the amount of military aid and arms sales constrains economic growth rates. Reducing aid and sales not only constrains economic growth but also constrains the rates of economic decline. Defense spending is similarly affected. When the economic sector suffers as a result of reduced military assistance, the welfare of the international trading

sector is also affected. When the size of a nation's economy drives the international economic sector, any decline or limitation on the domestic economic sector will make a nation a less attractive trading partner. The interactive effect of trade on the economy means that a negative feedback link causes reinforcing negative declines in each sector.

When economic conditions deteriorate, nations become candidates for higher turmoil. In fact, when aid is reduced, the level of turmoil in the region increases. For example, Jordan's turmoil level is substantially increased as aid is reduced (see Chapter 2 of this volume). No doubt these increased levels of turmoil are traceable to the less than favorable economic conditions that result from the withdrawal of military aid.

As would be expected, military manpower also responds to reductions in military aid and arms sales. But the pattern that emerges is complex. Nations that experience large aid reductions do not reveal correspondingly large manpower reductions. In fact, they reflect little change at all. This finding suggests that aid and arms purchases are characteristic of nations whose militaries are of a level of sophistication where such support is used primarily for upgrading the military establishment. Those nations that receive small amounts of aid experience reductions in their military manpower. These weaker and poorer nations depend on military manpower for military strength and use aid to finance their "start up" armies. These efforts are thwarted when aid and arms are denied.

The levels of conflict in the region were expected to decline when aid and arms purchases were arbitrarily reduced. Indeed, the level of conflict does respond to the policy manipulations. The decline in support for the military sector that comes from the superpowers causes a corresponding decline in the level of conflict. In every case where aid is measurably reduced (Egypt/Israel), conflict is reduced. However, the extent of the reduction is almost negligible although the direction of change meets our expectations. The degree of change in conflict is clearly a function of the size of the aid and arms sales reduction. In

this simulation, however, the amount of aid and arms sales reduced was evidently not large enough to produce a sizable reduction in conflict. Other simulations that reduce the selected variables to lower levels can be tried to determine when conflict levels are maximally affected. This particular simulation, which involved severe reductions, failed to identify the effective level that would result in the emergence of more peaceful conditions in the Middle East.

One additional aspect of the current forecasting model is central to this discussion of international conflict in the Middle East. Conflict is a function of past conflict as well as defense spending and arms races. Thus, unless a reduction of military aid and arms purchases drastically reduces conflict initially, the higher level of conflict will continue to produce high conflict forecasts. Thus, if the reductions are ineffectual in the beginning, the level of conflict will fail to decline measurably. Real reduction in tension, not just reduction in armament, is necessary if peace is to be brought to the Middle East.

Despite the failure of the simulation to produce marked decreases in conflict as a result of the changes made in selected variables, the decline in military aid and arms sales did reduce the level of conflict. Of course, this suggests the need for cautious formulation of military aid and arms sales policies. It is clear from the regional forecasts (see Chapter 2 of this volume) that the decline in the Israeli economy demands that some form of military assistance be forthcoming from the United States if Israel is to maintain its military strength. Aid and arms also contribute to the expansion of the military establishments of the Middle Eastern nations, resulting in increased conflict. When such support is withdrawn, conflict does decrease but only to a limited extent. Careful policy choices will have to be made in arms transfers to this region.

Latin America

Simulation Strategy. Military assistance provides a powerful explanation of several variables characteristic of the Latin American countries. Major

positive and negative shifts in military aid should cause appropriate shifts in environmental descriptors, thereby changing the Latin American environmental forecast. The Latin American simulation is based on the assumption that aggressive Soviet foreign policy involves the provision of substantial amounts of military aid. Four countries in Latin America were selected -- Cuba, Bolivia, Peru, and Panama -- based on their past political instability and tendency to reduce their dependence on the United States. Of course, Cuba is currently a recipient of Soviet aid. The other three countries have periodically engaged in anti-American behavior. Peru, for example, has purchased arms from the Soviet Union while Panama was chosen because of the stalemated Panama Canal treaty negotiations. Bolivia was selected because of its history of domestic political instability.

The specific simulation strategy for Latin America involves increasing Soviet military aid to Bolivia, Peru, and Panama during the period 1978-1983. The amount of Soviet military aid given to these countries during the five-year period was set equal to the amount given by the Soviet Union to Cuba during the base year of the forecast, 1970. The actual amount was equivalent to military aid per capita for 1970. After 1983, Soviet military aid was terminated and no further changes were made in military aid to Bolivia, Peru, and Panama. Hence the effect of providing and withdrawing aid was examined in a single simulation.

Since military assistance is a potent predictor of defense spending in Latin America and since expansion of the Latin American military establishments typically requires economic support, we expected the increase in Soviet aid for this five-year period to affect economic growth in the three countries. Furthermore, military aid was expected to affect national alignment. Finally, since many nations in the region engage in arms races despite the low level of international conflict, increases in defense spending that result from the influx of Soviet aid were expected to generate projections that signal incipient arms races between the three selected countries and their traditional rivals.

Findings. The simulation for Latin America performed as expected and, in addition, pointed out some subtleties in the relations and attributes of the nations selected. For example, the influx of Soviet aid to the three countries was expected to accelerate their economic growth. This occurs in Panama but not in either Bolivia or Peru. This conclusion, however, must be qualified. As shown in Chapter 2, where the standard forecast for Latin America is interpreted, Panama is forecast to experience a rather precipitous economic decline during the beginning of the forecasting period. The influx of Soviet aid prevents this decline from becoming as drastic as it appears in the standard forecast. Thus, Panama's economy is positively affected by military assistance from the Soviet Union.

Both Bolivia and Peru increase their economic growth rather substantially during the standard forecasting period. As forecast in the simulation, economic growth is constrained as the percentage of change from one year to the next is smaller in the simulation than in the standard forecast. Because less growth is experienced when the two countries receive military aid from the Soviet Union, they also spend less on defense.

Because Panama has more marginal resources due to the slower decline in its economy, it spends more as a result of the influx of military aid into its defense establishment. It is clearly responding to a stimulus produced by Soviet aid, although the amount of aid is not large enough to prevent further stagnation or produce growth in its economy. Bolivia and Peru fail to respond to the influx of Soviet aid, primarily because that aid is proportionally too small to reflect Soviet penetration into the three nations.

The nations stimulated by Soviet aid respond by increasing their alignment toward the Soviet Union. The standard forecast revealed increasing Peruvian alignment toward the Soviet Union. Hence, only Peru failed to show any new major alignment shift. However, because it originally is aligned with the Soviet Union, Peru reveals a slight increase in the solidification of its orientation. The two countries with no history of economic

or political alignment with the Soviet Union, Bolivia and Panama, reveal increased alignment instabilities as a result of the aid received, as was expected.

The economic sector clearly influences the extent to which the nations will be involved in international alignment should Soviet aid be forthcoming. Simulated results for Peru and Bolivia show limited economic growth. Economic declines for Panama are constrained. These factors make all three countries less attractive as international trading partners. Thus, as a result of the Soviet aid, the extent to which the countries are involved in international economics is decreased.

One expectation that failed to materialize as a result of the increased amounts of Soviet aid was evidence of any incipient arms race between Latin American rivals. The small amounts of Soviet aid do not inspire accelerated economic growth, a portion of which invariably is diverted into defense spending. The amount of Soviet aid distributed to the three countries selected was simply too small to produce rival defense spending.

The Latin American simulation can be carried out again with substantially increased amounts of Soviet aid, and the impact of this policy shift on rival defense spending can be investigated. In fact, additional questions arise from these results. At what aid level does the Panamanian economy begin to reverse its economic decline? How much aid is required to accelerate growth in Bolivia and Peru? What amounts of Soviet aid would be required to match increases in U.S. aid that would have similar effects on the nations in Latin America? This simulation suggests that the impact of aid is felt more readily by the smaller Latin American nations. Thus, military aid could accelerate the growth of the smaller and weaker Latin American economies. However, unless large amounts of aid are distributed, the impact on the transitional economies is unfavorable.

By far the most important finding of this simulation is the impact of Soviet aid on the alignment orientations of the countries selected. Even

small amounts of military assistance from the Soviet Union have a limited impact on the alignment of the nations with that superpower. Thus, Soviet penetration through military aid can affect alignment in Latin America, at least in selected countries.

Although we have only identified a single form that Soviet influence might take, military aid does increase the potential for Latin American-Soviet alignment. But if economic development is not forthcoming along with Soviet penetration, such a policy could backfire, resulting in rejection of the Soviet Union from the region.

Africa

Simulation Strategy. In Africa, a dyadic relationship between Ethiopia, currently of strategic value to the United States, and Somalia, currently the object of increased Soviet aid and military support, was simulated. We attempted to generate a classic form of international competition between two countries that are client nations of the two superpowers where a potential for relatively intense conflict exists. The simulation is based on the assumption that U.S. initiatives to counteract Soviet penetration will succeed in reducing conflict between Ethiopia and Somalia. Specifically, we have simulated increased U.S. cooperation and economic and military aid to Somalia that is countered by the Soviet Union with similar forms of assistance. As a result of the Soviet response, the United States is simulated to withdraw its assistance to Somalia. While the U.S. initiative is undertaken in Somalia, the United States is also upgrading its support of Ethiopia to maintain that country as an ally.

The specific operationalization of this simulation is as follows. In 1970, the United States provided Ethiopia with $11 million in military aid and $9 million in economic aid. Starting in 1976, military and economic aid to Ethiopia was doubled to $22 million and $18 million respectively. In addition, U.S. military and economic aid to Somalia was increased to the same amounts. A similar strategy was applied to U.S.

cooperative behavior toward Ethiopia and Somalia for 1975-1979. After three years (in 1978), the Soviet military and economic aid was increased to Somalia to $22 million and $18 million respectively and its cooperative behavior to that country matched that of the United States. Then, in 1978, the United States began to reduce its attempt to penetrate Somalia by reducing its military aid to zero in 1978 and all economic aid to zero by 1979. Finally, in 1980, all U.S. initiatives toward Somalia are ended. The simulation, then, is permitted to continue until 1995 with the United States continuing to provide Ethiopia with military aid, economic aid, and cooperation that double its 1970 levels. Simultaneously, Soviet military aid, economic aid, and cooperative behavior equal to U.S. activity toward Ethiopia are continued toward Somalia for the duration of the forecasting period.

The influx of economic and military aid was expected to affect alignment patterns, alignment stability, and the potential for conflict between the two African countries and their economic growth. This simulation represents the most complex policy combinations that were used in any of the sample simulations and gives an excellent example of the degree of sophistication that can be introduced into the JCS/J-5 long-range forecasting capability. Finally, it offers an opportunity to demonstrate how complex policy combinations can be mapped into the future by specifying Soviet and U.S. initiatives and responses that involve single nations or groups of nations. In this way, the impact of superpower interactions on other nations can be evaluated.

Findings. Some very interesting results are generated by this simulation. Currently Ethiopia and Somalia reveal total gross domestic products that are approximately equivalent. But, because of the size of Ethiopia's population, that country is much poorer on a per capita basis. As a result of the five years of U.S. and Soviet involvement, Somalia improves its economic position substantially. In fact, it widens its economic gap with Ethiopia by about five times. At the same time, major reversals occur in defense spending.

In 1976, Ethiopia expends approximately $45 million on defense and Somalia only $27 million. As a result of the large quantities of aid given to Somalia by the United States, this situation is reversed in 1978 with Ethiopia's defense expenditures reaching $59 million and Somalia's reaching $88 million. By 1980, as a result of its rapid economic progress, Somalia is spending twice as much as Ethiopia ($143 million to $73 million) on defense.[2]

Alignment was expected to shift as a result of the increases in U.S. aid to Somalia, but this did not occur. In fact, because the impact of aid is to accelerate growth, the primary effect was to increase Somalia's involvement in international relations. Politically, Somalia remains aligned with the Soviet Union during the entire period of U.S. penetration. There is little effect on the alignment instability of either of the countries.

This simulation was designed to assess the impact of superpower penetration into two rival countries and to determine the impact of increased U.S. and Soviet aid on their future propensities to conflict. We assumed that aid would have a negative effect on the conflict probabilities between the two countries. As a result of the increasing aid to Ethiopia and Somalia, conflict between them becomes almost a certainty. In the standard forecast, Somalia remains a rather peaceful nation but Ethiopia demonstrates a high propensity to conflict. When the United States and the Soviet Union increase their penetration of Somalia and provide it with military support, that country's conflict probability increases fivefold. In 1977, two years after the U.S. initiative begins, Somalia's conflict probability jumps 138 percent. Thus, we would conclude that policies that would ultimately improve the capabilities of Somalia's defense establishment to conflict will generate situations where international violence becomes highly probable.

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[2] The reader should remember that these absolute figures are products of the simulation and have imprecise meanings in real-world terms. The relative levels do allow comparison of the two countries being manipulated and can be considered more meaningful.

One final aspect of the simulation should be pointed out. Evidently the impact of military and foreign aid is felt in domestic politics. Somalia becomes a candidate for government change in 1981, three years before it does in the standard forecast period. Ethiopia, with its high levels of turmoil, is always a candidate for government change. The impact of Soviet and U.S. penetration on the Ethiopia-Somalia dyad demonstrates that certain forms of superpower behavior can exacerbate already tense situations. Clearly, as major superpower rivals attempt to influence client nations, the outcomes are not always favorable. Clearly in the Somalian case there is a trade-off between accelerated economic development and the tendency for economic development to stimulate defense spending which ultimately can increase the probability of international conflict. However, these simulated results could occur if vast quantities of Soviet aid were forthcoming to Somalia. The simulation does not imply that U.S. support must have negative implications but that, as rapid economic growth is experienced by African nations with histories of traditional conflicts, significant imbalances in military strength may be so threatening that conflict becomes virtually inevitable.

SUMMARY

This chapter has described three sample simulations that were generated by changing U.S. and Soviet policy variables for specified periods of time in the Middle East, Latin America, and Africa. The changes in U.S. and Soviet policy were based on plausible and relevant assumptions about the way the United States and the Soviet Union compete in the international system for the less developed countries. These three simulations are only examples of the many options that now exist in the area of long-range forecasting and simulation within JCS/J-5. It is hoped that the discussion has demonstrated the valuable innovations that have been made with regard to long-range forecasting and simulation. Currently, the defense community has the capability to assess the impact of alternative policies on three less developed regions. Furthermore, the impact of Soviet policies can be assessed in a like manner. And, as demonstrated

in the African simulation, the impact of reciprocal behavior on the objects in any relationship within either of the regions can be assessed.

The findings that were generated by each simulation can be summed up as follows:

- In the Middle East, a reduction of military aid and arms clearly causes a decline in economic growth and thereby influences the amount of defense expenditures that nations divert from their total resources. The decline in defense expenditures, in turn, affects the degree of conflict in the region to a limited extent. As simulated, the reductions in military aid appear to have been too small to influence the level of conflict. However, some change was noted, and this change was in the expected direction. We conclude that reducing military support to the Middle East region can ultimately affect the level of conflict in that region, but only to a limited extent.

- Small amounts of Soviet aid will have little effect on maintaining alignment toward that country or in accelerating economic growth in Latin America. Soviet aid to selected Latin American countries (Bolivia, Panama, Peru) stimulated growth in Panama and constrained growth in the other recipients. International alignment is affected to a certain extent while aid is being given, but returns to the original orientation once aid is discontinued.

- In Africa, competition between the Soviet Union and the United States was simulated. The reciprocal behavior of the two countries toward Ethiopia and Somalia revealed that large influxes of military and economic aid can accelerate economic development but that much of the growth ultimately is diverted to defense spending. The rapid acceleration in defense spending exacerbates an already tense situation between the two African countries so that the probability of violence becomes extremely high. The influx of aid also affects the domestic political situation and causes increased levels of turmoil beyond that projected by the standard forecasting model.

CHAPTER 5. SUMMARY

This document has described the development and application of long-range forecasting models for the Middle East, Latin America, and Africa. This research was supported by the Advanced Research Projects Agency of the Department of Defense. The primary goals of this project were to improve the long-range forecasting capability in the defense community by developing high quality forecasting models for the Middle East, Latin America, and Africa and to introduce new methodologies for defense forecasting, including a simulation capability. These innovations provide JCS/J-5 with a forecasting capability tailored specifically to the development of long-range estimates for strategic plans and requirements. In addition, they permit hypothetical policy choices by the United States and the Soviet Union to be evaluated in an experimental setting by giving analysts the capability to alter U.S. and Soviet behavior toward these Third World regions. Five tasks were necessary for meeting the objectives of the project.

- Define, in consultation with JCS/J-5 personnel, three regions for the development of long-range environmental forecasts.
- Identify a set of key concepts for inclusion in the forecasting models and develop operational representations of them.
- Establish linkages among key variables measuring each concept and identify, where appropriate, manipulable exogenous predictors of these variables.
- Estimate parameters for each regional forecasting model using techniques appropriate to the particular structure of that model.
- Develop stochastic simulations of the forecasting models to generate a range of values for the operational measures and multiple regional futures.

Each task has been successfully completed and the stochastic simulation models have been implemented in the National Military Command System Support Center (NMCSSC) to support JCS/J-5 long-range forecasting requirements. The stochastic models that have been developed for the Middle East, Latin America, and Africa are:

- Dynamic. The equations and forecast variables focus on change from one year to the next. Thus, the projections permit an assessment of the degree of change on each variable as well as a comparison of national profiles across all variables.

- Sensitive to U.S. and Soviet behavior. The models include variables that capture the behavior and policies of the United States and Soviet Union toward the Middle East, Latin America, and Africa. They permit J-5 analysts to alter specific policy-sensitive variables to project alternative futures.

- Region-specific. Substantive peculiarities of each region are taken into account in specifying the forecasting equations, and the parameters that drive the forecasting models are determined for each region.

Development of the forecasting and simulation models for the Middle East, Latin America, and Africa has required a number of specific accomplishments in order that the overall goals of the study be met. These may be summarized as follows:

- Three less developed regions were identified and defined in consultation with JCS/J-5 personnel. (See Technical Appendix, Annex I.)

- The set of forecast variables was expanded and modified to take into account substantive peculiarities of the lesser developed regions vis-a-vis the five central environmental descriptors (international conflict, international trade, domestic instability, and national power base) that were identified as relevant to JCS/J-5 interests.

- Several national power variables were added to capture more realistically the complexities of economic, political, and military power.

- A new approach to measuring alignment was developed in which trade and U.N. voting were combined to capture the incongruities between international economic and political orientations that characterize the Third World nations.

- Turmoil was redefined to represent more accurately popular discontent and unrest in the nations of the Third World. Also, a coup propensity indicator was developed to measure the extent to which a country is prone to irregular government change.

- A tension ratio variable was included to represent the tendency for a less developed country to engage in military conflict. This ratio is derived by comparing a nation's actual defense spending to its expected spending (given the size of its GDP).

- A set of 18 theoretical forecasting equations were developed in consultation with JCS/J-5 personnel. These equations were tested empirically and parameters were estimated for each region. The result was three region-specific forecasting models that capture the substantive differences characteristic of the Middle East, Latin America, and Africa.

- A set of exogenous predictor variables, including arms transfers, trade, foreign aid, and military aid, were included as policy sensitive variables. The inclusion of these variables permits the analysts to simulate change in outside influences so that assumptions underlying plausible alternative policies can be evaluated in an experimental setting.

This report has two major foci -- regional forecasts and regional simulations. Chapter 2 describes the environmental forecasts generated for the Middle East, Latin America, and Africa. These forecasts were produced by the standard forecasting models, that is, models that assume no structural or policy changes for the next 20 years. Chapter 3 describes three hypothetical simulations that map the impact of policy shifts into the future.

The future environment of each region as described in Chapter 2 can be summarized as follows:

- The Middle East will remain the most volatile area of the three studied. Some of the larger nations will

experience accelerated economic growth but many of the smaller nations will remain economically stagnant. The oil-exporting nations have the capital surpluses for rapid economic growth which may be disrupted by deliberate policies by the Western nations to lessen their dependence on Middle Eastern oil. The area will continue to experience international hostilities that will derive not only from recurring Arab-Israeli confrontations but also from traditional Arab rivalries. The nations in the region demonstrate, and will continue to demonstrate, a propensity to align themselves with the superpowers. Those that are most unstable in their alignment have economic sectors that make them attractive to the Western World as exporters and consumers and are politically oriented toward Third World issues in the United Nations.

- The long-range forecast for Latin America revealed considerable potential for accelerated economic growth only in the larger nations such as Argentina, Brazil and Mexico. There is a tendency for continued, albeit less intense, alignment with the United States, with only a few nations becoming Soviet-oriented actors. Some of the smaller nations, such as Cuba, Panama, and Bolivia, will experience continuing high levels of domestic instability. Little international conflict is forecast except for those nations (Brazil, Mexico) that have experienced hostilities in the past.

- The long-range forecast for Africa reveals that the region will remain economically stagnant. Also, domestic conflict levels will remain high and many of the nations in the region will be candidates for government change. International conflict levels will remain high between traditional rivals. Finally, many of the nations, including those in which the United States has vested strategic interests, will choose to remain unaligned with either superpower.

In addition to the standard forecast for each region, this research generated one experimental simulation each for the Middle East, Latin America, and Africa. In the Middle East the impact of a reduction in military aid and arms transfers on economic growth, defense spending, and international conflict was simulated. In Latin America, an influx of Soviet military aid to Bolivia, Panama, and Peru was simulated to determine the impact on economic growth, defense spending, and international alignment. In Africa, an initiative by the United States and

a counter-initiative by the Soviet Union to penetrate Somalia to influence its international alignment were simulated. These simulations, described in Chapter 4, can be summarized as follows:

- In the Middle East, the reduction of military aid and arms caused a decline in economic growth and influenced the amount of defense expenditures that nations divert from their total economic resources. A decline in defense expenditures, in turn, affected the degree of conflict in the region to a limited extent. As simulated, the reductions in military aid appear to have been too small to influence the level of conflict substantially. However, some change was noted, and this change was in the expected direction. We conclude that reducing military support to the Middle Eastern region can ultimately affect the level of conflict in that region, but only to a limited extent.

- Small amounts of Soviet aid will have little effect on maintaining alignment to aid that country or accelerating economic growth in Latin America. Soviet aid to selected Latin American countries (Bolivia, Panama, Peru) stimulate growth in the smallest economy (Panama) and constrain growth in the other recipients. International alignment is affected to a certain extent while aid is being given, but returns to the original orientation once aid is discontinued.

- In Africa, competition between the Soviet Union and the United States was simulated. The reciprocal behavior of the two countries toward Ethiopia and Somalia revealed that large influxes of military and economic aid can accelerate economic development. When development is accelerated, defense spending also increases. The acceleration in defense spending exacerbates the already tense situation that exists between the two African countries so that the probability of violence becomes extremely high.

These simulations are only examples of many plausible situations that can now be simulated with the forecasting models that are available to JCS/J-5 through the NMCSSC. The development of the current forecasting and simulation models clearly advanced the quantitative forecasting capability of the defense community beyond its current level. Not only

do the forecasting models permit the many important attributes of the lesser developed nations in the Middle East, Latin America, and Africa to be projected over the medium- and long-term future, the models permit alternative policies to be simulated in an experimental setting as well. This forecasting and simulation capability permits the JCS/J-5 analyst to explore alternative regional environments that derive from the impact of U.S. and Soviet behavior. In this way, either country's behavior toward the Middle East, Latin America, and Africa can be evaluated for its implications for strategic policy and planning.

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